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16. Abstract (Limit: 200 words)

This study examines the potential for separate volume performance standards for qualified physician volunteer organizations whose experience would be measured directly, rather than based upon the experience of the national Medicare Volume Performance Standards (MVPS) specified by OBRA 1989. Empirical analyses of fee-for-service provider characteristics and utilization patterns from the provider and beneficiary 1987 and 1989 Part B Medicare Annual Data files were conducted to explore models in which volume performance was based upon historical volume and intensity rates for a volunteering organization. Four models considered for implementing voluntary volume performance standards are: (1) enrolled programs such as HMOs, PPOs, and HCPPS (enrollment model); (2) large multi-specialty groups that manage a wide range of services for their patients (patient management model); (3) other practices with high levels of reimbursement that could manage their own services (practice management model); and (4) combinations of practices voluntarily grouped (pooling model). The authors confirmed that Medicare physician reimbursements tend to be highly concentrated among a relatively small number of practices. And although Medicare beneficiaries are unlikely to restrict their use of physician services to a single practice, the study found that significant numbers of beneficiaries use the same providers in consecutive years. Based on empirical findings about practice size and stability of patient volume and expenditures for non-enrollment models, the authors suggest that the voluntary VPS might be extended first to multi-specialty groups treating about 1,400 Medicare beneficiaries annually. Over fifteen tables and a bibliography are included.

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EXECUTIVE SUMMARY

Background

Consistently large annual increases in Medicare Part B expenditures have prompted the Federal government to undertake Medicare physician payment reform. Three major initiatives were enacted as part of the Omnibus Budget Reconciliation Act of 1989: a fee schedule based on a resource based relative value scale, national Medicare volume performance standard rates of increase (MVPS), and limitations on beneficiary liability.

The fee schedule will give physicians an incentive to be efficient in terms of their own cost per unit of service. With fees determined prospectively by Medicare, physicians can increase net income by lowering the cost of production. Under MVPS, future physician fee levels would be affected by the extent to which actual aggregate Part B expenditure levels deviated from target levels. This linkage is presumed to establish collective incentives for fee-for-service providers to control service volume and intensity.

As currently configured, however, MVPS fails to create economic incentives for individual physicians to be efficient because potential fee penalties would apply to all physician practices regardless of their relative efficiency. Physicians may seek to recover Medicare revenues by increasing volume and intensity. Furthermore, although limitations have been placed on the amount that physicians can bill their patients per unit of service, increases in volume and intensity also may result in higher total costs for beneficiaries.

In support of a Secretarial examination of alternative volume performance standards, this study explores the potential for allowing qualified physician organizations to volunteer for separate volume performance standards that measure their own experience directly, rather than as part of a large pool of providers. Under such arrangements, volunteering organizations would have economic incentives to control volume and intensity levels for their Medicare patients. Key objectives of this study are to analyze the feasibility and desirability of the concept, and to explore methods for measuring volume and intensity performance.

Increasingly, private sector payers have been attempting to control the volume and intensity of services, and some of their strategies may be useful for Medicare as well. These strategies include targeting practices that are relatively efficient and desirable on administrative and quality criteria, and encouraging individuals to use those practices. Economic incentives are increasingly being established for those providers to control the volume and intensity of services. For example, total budgets may be established with some proportion of fees withheld pending determination of whether the aggregate volume of services exceeds the budgeted level.

Alternative delivery systems

Enrollment of members into managed care delivery systems such as HMOs and PPOs greatly facilitates opportunities to increase efficiency. One important policy objective, therefore, could be to measure volume and intensity separately for existing health plans that serve Medicare beneficiaries on an enrolled basis. This would permit such plans to avoid blanket fee penalties

brought about by unsatisfactory volume performance outside the plans, and is consistent with recommendations of the Physician Payment Review Commission to encourage beneficiary enrollment in alternative delivery systems.

Because HMOs with risk contracts are paid on the basis of prospective AAPCC rates, Medicare is insulated from volume and intensity increases within those plans. Furthermore, AAPCC rates are determined on the basis of Medicare expenditures in the fee-for-service sector, without regard to actual costs within the HMOs. Therefore, risk contractors could be handled separately under MVPS, perhaps by adjusting AAPCC rates to remove the effects of fee penalties imposed on fee-for-service providers. Plans operating under cost contracts, including HMOs and Health Care Prepayment Plans (HCPPs) are reimbursed according to their costs per enrollee. Volume performance in those plans could be measured by comparing yearly rates of increase in reimbursements per enrollee to targets based on the MVPS.

Volume standards for fee-for-service providers

Efforts in the private sector have resulted in substantial enrollment into managed care plans and aggressive managing of care within the fee-for-service sector. However, the Medicare program has made less progress in both areas. The vast majority of Medicare beneficiaries receive their care in the fee-for-service sector, which has the weakest incentives to control costs. Therefore, significant contributions to overall efficiency will require working with non-enrolled beneficiaries and fee-for-service providers to control the volume and intensity of their services.

Effectively controlling volume and intensity rates with voluntary volume performance standards at the practice level might form the basis of short term and long term physician payment reforms that permit Medicare to better understand and control utilization rates. Because of the fee-for-service basis of payment, using volume and intensity standards can avoid the financial losses for Medicare associated with favorable selection in capitated systems. For providers under a volume performance standard in the fee-for-service sector, to avoid serving sicker beneficiaries or to underserve patients is to forgo revenues; moreover beneficiaries are free to seek care from other providers. Under capitation, selection effects can more than offset efficiency gains. Although incentives to control volume and intensity are lower under targets as compared to capitation, an empirical question is whether, in voluntary systems, the induced efficiencies and savings without partial selection offsets exceed those of capitation.

Targeting practice and patient management

Fee-for-service providers can control the volume and intensity of Medicare covered services, if given an adequate incentive to do so. At a minimum, physicians can affect the volume and intensity of their own services, i.e., manage their own practices. Practice management is consistent with the business perspective of a medical practice, in which patient costs and revenues are critical aspects of performance.

A subset of fee-for-service providers may be in a position to help control the volume and intensity of a broader range of services -- even services provided in other practices -- by guiding patients through the system. Patient



management is consistent with the broad clinical perspective of primary care providers, including many multi-specialty group practices.

Establishing separate volume performance standards for volunteering organizations would incorporate into the reimbursement system incentives for provider efficiency. The breadth or scope of those incentives would depend on which services were reflected in the volume and intensity measure for the organization. Defining the volume and intensity measure only in terms of services delivered in the practice would give providers incentives to manage their practices, while broadening the definition to include other services would extend those incentives.

Although beneficiaries do not enroll with providers, the models explored use beneficiaries seen by the practice as the point of reference for measuring volume performance. Measures of volume performance corresponding to patient and practice management efficiencies can be viewed as falling along a continuum: weighting equally all services; placing greater weight on services inside the practice; or including only services inside the practice. The continuum could be extended in either direction to reflect an even wider range of Medicare services than are included under the MVPS (e.g., ambulatory surgery), or only selected services within the practice (e.g., physician services). Once again corollaries exist in the private sector with capitation programs being used for specific types of providers, primary care and specialists, as well as total per capita payments for professional services.

Administrative issues

There are conceptual and administrative difficulties that arise in the absence of enrollment into a specific provider network. For example, providers are less able to control the utilization patterns of their patients when beneficiaries are not required to limit their choice of providers. Without enrollment, moreover, beneficiaries can receive services from several different practices, so that the same beneficiaries might be counted in more than one group's volume and intensity measure. However, the desirability of including incentives to contain the volume and intensity of services in the fee-for-service sector within the established national targets is a persuasive and perhaps even compelling reason for developing methods to address these issues.

Having every physician practice associated with a voluntary volume and intensity target would at one extreme link the volume and intensity targets with overall efficiency, but would not identify practices more likely to hold down costs. Limiting the number of participating practices would reduce the overall administrative burden, and would focus efforts on providers more capable of being efficient. Therefore, criteria are needed for identifying those practices that will be capable of successfully operating under their own volume and intensity standard.

Empirical analyses of fee-for-service providers

This study carried out empirical analyses of fee-for-service provider characteristics and utilization patterns from the provider and beneficiary standpoints. Data were used from the 1987 and 1988 Part B Medicare Annual Data (BMAD) 5% Provider and Beneficiary files. Providers were studied using

all physician practices in the 1988 BMAD Provider Summary file, and a subsample of about 2,700 practices (including solo practitioners, single-specialty groups and multi-specialty groups) from the 1988 BMAD Provider file.

The data suggest that almost two-thirds of practices were solo practitioners, 26 percent were single-specialty groups, and three percent were multi-specialty groups. Medicare Part B reimbursements are highly concentrated among providers with the highest volume. Table 1 shows that one percent of providers received over 21 percent of payments, two percent of providers received over 30 percent of payments, and ten percent of providers received over 57 percent of payments. This skewness suggests the possibility of involving significant proportions of overall Part B expenditures with a few large organizations volunteering for separate volume and intensity targets.

Table 1

PROVIDERS RANKED BY PERCENTAGE OF REIMBURSEMENTS RECEIVED FOR 1988
(n=37,266)

<u>Provider Percentile</u>	<u>Percent of Reimbursements</u>	<u>Cumulative Percentage</u>	<u>Mean Reimbursement</u>
99	21.9	21.9	\$943,794
98	8.2	30.1	352,036
97	5.8	35.9	248,013
96	4.5	40.4	193,833
95	3.8	44.2	163,158
94	3.3	47.5	141,541
93	2.9	50.4	123,839
92	2.6	53.0	110,523
91	2.3	55.3	99,297
90	2.1	57.4	89,610
<90	42.6 %	100.0 %	20,214
50	0.088 %	--	3,805

Source: 1988 BMAD 5% Provider Summary file

This study explored models in which volume and intensity targets are based on historical volume and intensity rates for a volunteering organization, projected forward with an allowable rate of increase based on the MVPS. An important consideration is the reliability or stability of alternative volume measures. One way to measure temporal stability is to test whether each practice's volume and intensity rate remains constant relative to other practices. In order to explore this issue, the rate of Medicare reimbursements per beneficiary seen within a practice was chosen as a potential volume and intensity measure. Stability was estimated in terms of the coefficient of variation (CV) in beneficiaries' reimbursements within a

practice, and mean absolute percentage errors (MAPEs), i.e., differences between the actual and projected 1988 reimbursements per beneficiary seen, based on a national average growth rate between 1987 and 1988.

Total observed Part B reimbursements per beneficiary seen turned out to be rather unstable across all practices. However, preliminary analysis suggests that MAPE values might differ from one year to the next by an average of less than 5 percent for practices providing services for more than 1,400 Medicare patients. The CVs declined, but the MAPEs did not, when reimbursements for high cost outliers within the practice were truncated. MAPEs did decline when patients with \$50 or less in reimbursements were removed from the calculations. The stability of volume and intensity measures that include services delivered in other practices, i.e., the per capita or patient management perspective, was not analyzed in this study.

Empirical analyses of beneficiaries in fee-for-service

Data analysis using a sample of about 150,000 beneficiaries suggested that average expenditures were significantly higher for patients receiving services from many different providers in a year. Over half of beneficiaries receiving Medicare services in 1988 saw three or more different providers that year, and more than 39 percent of beneficiaries with claims used five or more practices during the year. Moreover, more than 80 percent of Part B reimbursements were for individuals seeing five or more providers. The fraction of beneficiaries hospitalized also increased with the number of different providers used: 56 percent of beneficiaries seeing five or more providers were hospitalized, compared to 2.6 percent of those seeing only one practice and 13.3 percent of those seeing three different practices. Table 2 shows how mean reimbursements per beneficiary increase with the number of practices seen during the year.

Table 2

MEAN PART B REIMBURSEMENTS PER BENEFICIARY BY NUMBER OF PROVIDERS SEEN (1988)

<u>Number of Providers Seen</u>	<u>Mean Reimbursements</u>	<u>n</u>
Only one	\$ 93.4	23,620
Two	221.3	18,993
Three	389.8	15,154
Four	597.0	12,402
Five or more	1,961.4	45,969

Source: 1988 BMAD Beneficiary file

In spite of this apparent fragmentation of care, beneficiaries' physician reimbursements tend to be concentrated among a few providers. Single practices on average account for about 40 to 70 percent of a beneficiary's total physician reimbursements during a year, with the higher percentages

being associated more with multi-specialty groups. Furthermore, about 40 percent of Medicare revenues within a practice during a year are associated with patients also seen in the practice the previous year.

In computations of reimbursements per capita, if lesser weights were applied in the volume and intensity measure to beneficiaries with greater relative use of outside providers, a non-enrollment patient management model may begin to approximate an enrollment model where beneficiaries are locked in. While further research is warranted to better assess the effects of such a weighting scheme on the stability of performance standards in a patient management model, the study findings have favorable implications toward the feasibility of non-enrollment patient models with diminishing weights for reimbursements to other outside providers.

Implementation strategies

Of course, most of these findings are averages; specific practices may have considerably more involvement with their Medicare patients. Medicare could seek participation among practices that are, in fact, higher than average in their involvement with Medicare patients and in their commitment to quality assurance.

Four strategies for implementing the concept of voluntary volume performance standards are: (1) enrolled programs such as HMOs, PPOs and HCPPs; (2) large multi-specialty groups that manage a wide range of services for their patients; (3) other practices with high levels of reimbursements that could manage their own services; and (4) combinations of practices voluntarily grouped under a common Medicare volume and intensity standard, perhaps also with the intention of coordinating their services.

Evaluating a voluntary component of MVPS

A potential system in which separate volume performance standards are established for volunteering organizations needs to be evaluated on a number of dimensions, some of which relate to its conceptual desirability and others to its operational feasibility. Potential benefits must outweigh the added administrative cost and complexity, as well as other potential weaknesses.

An important consideration is the willingness of providers in alternative delivery systems or the fee-for-service sector to participate. Voluntary participation rates will probably depend on the expected generosity of future Medicare fee updates under MVPS. Cost savings for Medicare will partly depend on the extent of participation among providers. With regard to physician participation, issues such as the effects of self-selection among participating providers, insuring beneficiary access to needed services, and potential gaming of volume and intensity measures need to be considered.

Useful benchmarks for many comparisons are capitation and the MVPS as currently configured. As a first approximation, it would appear that incentives for unintended effects such as cream-skimming and underservice are much weaker under a fee-for-service payment system with volume and intensity targets, as compared to a prospective capitation payment system. Also, the impact could be far more reaching than with capitation. Applicability of incentives to the dominant fee-for-service system represents an opportunity

for Medicare to significantly affect the delivery system. With regard to the MVPS, the voluntary component would seem to provide individual physicians with incentives to manage care efficiently and effectively. Moreover, forging relationships with providers selected on the basis of quality and efficiency could help to set in motion possible "spillover effects" to other practices. That is, standards of quality and efficient care may emanate from these chosen practices.

Chapter 1

INTRODUCTION

1.1 Medicare Volume Performance Standards

Medicare expenditures constitute over nine percent of the U.S. Federal budget and have been increasing rapidly throughout the 1980s. Medicare Supplementary Insurance (SMI) or Part B expenditures have grown more rapidly than Hospital Insurance (Part A) expenditures since introduction of the Prospective Payment System in 1983. Between 1978 and 1987, Medicare expenditures for physicians' services increased at an annual compound rate of 16 percent (Kay, 1990).

The problem of rising Medicare expenditures involves both the quantity of services and the payments per unit of service. Portions of the increases are attributable to general inflation and to the rising number of Medicare beneficiaries. However, increases in fees exceeding inflation, higher per capita utilization of services, and higher intensity of services have also been factors. For example, Health Care Financing Administration (HCFA) actuaries estimate that 45 percent of the increase in Medicare physician expenditures between 1978 and 1987 resulted from growth in the number of services per beneficiary and greater intensity of services (Kay, 1990).

Recent Federal legislation addressed physician fee levels and the volume of services (OBRA, 1989). Fees based on resource based relative value scales (RBRVS) were selected as the physician payment form, replacing the longstanding customary, prevailing, and reasonable (CPR) basis for setting fee levels. RBRVS will begin to replace CPR on January 1, 1992 and will be phased-in through 1996. To address the problem of volume increases, Congress called for annual target rates of increase for Part B expenditures, known as

Medicare volume performance standard rates of increase (MVPS), and specified standards for fiscal year 1990 in the legislation.¹

The inclusion of the volume performance standard (VPS) concept in the physician payment reform legislation is Medicare's first attempt to link fees and utilization in the fee-for-service sector. Presently under MVPS, physician service volume is to be measured in the aggregate for the nation (calculated separately for surgical and non-surgical services). Included are most physician, ancillary, and allied health professional services reimbursed by Medicare carriers.² If national expenditures for those services exceed a pre-determined target based on the prior year's total expenditures and a specified rate of increase, a penalty is imposed on physicians two years later by reducing the rate of increase in their fees. Thus, Medicare will be able to recover at least a portion of Part B expenditures that are in excess of the target for a particular year.

1.2 Achieving Volume Control Under VPS

A drawback of the national VPS approach is that it does not necessarily create any real economic incentive for individual physicians to control inappropriate utilization. Individual physicians would face a "free rider" situation in which their own behavior would have no appreciable effect on national volume performance. Worse still, individual physicians may perceive a kind of "prisoner's dilemma" in which it pays for the individual to increase volume and revenue under the expectation that the national volume performance will exceed the target and all physicians' fees will be reduced.

Proponents of MVPS anticipate that several factors could lead to lower total volume, including collective incentives to shape the clinical decisions

¹The MVPS is based on projections of total expenditures, not the volume of services per se. However, since RBRVS sets fees for each unit of service, expenditure targets (and variances from those targets) reflect volume performance. Hence, when it is understood that prices are determined in advance, volume and expenditure targets will be considered synonymous.

² See Appendix 1 for a more complete listing of services included in or excluded from the current definition of performance standards.

of individual providers, mandatory peer review activities, and possibly sanctions for providers delivering unnecessary services (Ginsburg, Leroy and Hammons, 1990; Rice and Bernstein, 1990; Fox, 1984). Physician organizations --including the American Medical Association, national specialty societies and state medical societies-- could encourage utilization control among their members, or assume responsibility for monitoring individual physicians' practice patterns in order to identify physicians whose utilization rates are excessive.

Physician associations in former West Germany have actively monitored practice patterns for many years (Kirkman-Liff, 1990). There, utilization and costs for individual physicians are compared to average rates for a relevant peer group. Physicians are asked to explain their practice patterns if they depart from the group average. To this point, however, physician associations in the United States have not monitored their members' economic behavior. For them to do so would require them to dramatically change their mission. The feasibility and legality of compulsory adherence to group norms in this country are beyond the scope of the present study.

An important aspect of the German system is that physicians are grouped geographically and according to specialty. More narrowly defined standards can better reflect differences in growth trends across market areas and different types of services. Furthermore, subnational and specialty-specific standards may distribute financial rewards and penalties more equitably among physicians. Rice and Bernstein (1990) argue that mandatory VPSs for physicians at the state level would be sufficient to evoke efficiency, as long as local physician associations are furnished with the authority and wherewithal to control individual physicians' practice patterns. HCFA is studying the possibility of using multiple performance standards of narrower scope, e.g., by locality, medical specialty, and type of service.

Measuring volume performance at the state level still may not provide strong economic incentives for individual physicians to restrict unnecessary utilization. Efforts to limit instances of unnecessary utilization by any

individual physician will continue to have negligible impact on aggregate volume performance (Hadley, 1984). What remains, however, is the possibility of creating opportunities for physicians who are willing to opt out of the treadmill of volume increases and fee reductions. Measuring the volume and intensity (VI) separately for specific physician organizations could relieve them of "guilt by association" inherent in the MVPS. Accordingly, this study explores the possibility of having physician organizations elect separate and binding volume performance standards in place of the performance standard rate of increase established for the year for such physicians.³

1.3 Volume Control Under Alternative Delivery Systems

There are alternatives to the unmanaged fee-for-service system that can create incentives for individual providers to control the volume of services. Common examples are health maintenance organizations (HMOs), which involve capitation payments, and preferred provider organizations (PPOs), which can reward provider efficiency with higher patient volumes. Medicare might also consider paying a capitation to physician entities, or to all physicians in a geographic area (Wallack, 1986; Wallack and Donovan, 1985; Burney et al., 1984).

The Physician Payment Review Commission has recommended expansion of Medicare involvement with HMOs as a way of providing direct economic incentives for physicians to control expenditure rates (PPRC, 1990). The Medicare program has made attempts to enroll beneficiaries in both HMOs and PPOs. However, neither provider nor beneficiary interest in these options has been consistently high. The most significant of these initiatives has been the HMO risk contract program, which was begun in 1985.

The results to date with HMO risk contracts have been disappointing, with relatively slow growth in enrollment during the past few years. As of

³The Omnibus Budget Reconciliation Act of 1989 (PL 101-239) Part 2 Provisions Relating to Part B, Subpart A -- General Provisions, Section 6102(a) Physician Payment Reform amends the Social Security Act (SSA) by adding a new Section 1848 -- Payment for Physician Services. See SSA, Section 1848(f)(4)).

June 1, 1991 there were just over 1.3 million enrollees in Medicare risk contracts. This is especially discouraging in light of growth rates in HMO commercial enrollment, which averaged 22 percent per year between 1983 and 1988 (HIAA, 1990).

Significantly hampering larger enrollment has been a widespread reluctance among HMOs to enter into, or to renew, risk contracts with Medicare. Much of the difficulty with the risk program has been attributed by HMOs to low payment rates (Tompkins, Porell and Pomeranz, 1988). Alternatively, HMOs with cost contracts, and PPOs operating under contract with Medicare, are paid on the basis of their cost experience. This removes some of the perceived arbitrariness in payment rates.

HMOs and PPOs require that beneficiaries choose to enroll into the plan, however. Getting beneficiaries to enroll into special programs can be difficult because enrollment often requires switching one's regular source of care and giving up complete freedom-of-choice among providers. Moreover, existing medigap policies (and Medicaid) already supplement the Medicare benefit package, which detracts from beneficiary incentives to enroll in alternative delivery systems. Short of making major changes in Medicare program benefits or revamping the general organization of health care delivery for Medicare beneficiaries, successful attainment of efficiency will require new ways to structure reimbursements and incentives to providers.

1.4 Maximizing the Scope of Economic Incentives

An important policy question emerges from this analysis: Can physician payment reform, including appropriate economic incentives to individual physicians, be broadly implemented without requiring beneficiaries to enroll in specific health plans? Related to that is another question: If beneficiaries were not required to enroll in specific health plans, would physicians voluntarily participate in payment reforms that involved economic incentives for providing efficient medical care?

This study addresses economic incentives for physicians serving beneficiaries in health plans with defined enrollment, and for physicians serving beneficiaries who are not enrolled in an alternative delivery system. Access to efficient delivery systems such as the enrolled health plans ought not to be overlooked, but the greatest gains in overall efficiency may occur from implementing appropriate incentives for beneficiaries and providers in the non-enrolled or fee-for-service sector. In particular, volume targets for fee-for-service providers could have the potential to establish economic incentives that help to change delivery patterns in medical practices.

Explored as part of the present study are conceptual, administrative, and empirical issues associated with replacing mandatory targets under MVPS with voluntary VPSs, such that target rates of volume increase pertain to the experience of specific physician entities. This will allow medical practices to operate within their own performance standard rates of increase by effectively managing their patients' care. Separate VPSs could thereby provide physicians with direct financial incentives to control service volume, and allow physicians to cooperate with the spirit of Medicare reform while avoiding blanket fee penalties.

This approach could be relatively straightforward for health plans with enrolled members. However, for other practices, it requires a "synthetic enrollment" process in which beneficiaries who are served by the practice are somehow included in the measure of volume performance. That is, beneficiaries need not make any formal decision to enroll with a provider or limit their freedom-of-choice, but are counted in practice-specific rates of service volume and intensity.

Successful implementation of voluntary VPSs for HMOs, PPOs and fee-for-service practices would help Medicare to keep pace with private sector innovations aimed at cost control. Employers have continued to make use of HMOs, utilization review efforts administered through insurance carriers, etc. More recently, however, cost containment efforts have established performance incentives for individual physicians. Thus, Medicare would be taking

advantage of the more widespread orientation of physicians to be efficient. Accordingly, if the targets operate at the provider level without having beneficiaries enroll, Medicare could vastly expand the proportion of Medicare patients receiving care in managed fee-for-service environments.

1.5 Overview of This Report

Discussed in the next chapter are different aspects of efficient medical care delivery, and the link between economic incentives and the behavioral aspects of efficiency. The third chapter discusses relevant approaches to provider reimbursement systems that might reflect appropriate economic incentives for efficient medical service delivery. Included are exploratory models for measuring volume performance in the enrollment and non-enrollment sectors. The fourth chapter presents analyses of Medicare claims data that shed light on service delivery patterns within and across existing physician practices in the fee-for-service sector. The fifth chapter discusses the empirical findings and potential program models that seem worthwhile to pursue further. The sixth chapter presents next steps for policymakers and for researchers interested in the implementation of voluntary VPSs.

BACKGROUND

2.1 Economic Incentives and Physician Behavior

During a typical day of practice, a physician makes hundreds of clinical decisions. The physician constantly estimates the expected benefits of treatment in the context of considerable uncertainty and significant differences among patients (Eisenberg, 1989). There is truth in the adage that "every patient is a special case", as there are innumerable intangibles associated with the art of medicine. Payers such as Medicare would like physicians to weigh those benefits against the cost of providing alternative forms of treatment. It is widely believed that the existence of insurance interferes with competitive market forces that might otherwise balance the benefits and costs to society, and that physicians now supply a volume and an intensity of services that are greater than the socially optimal levels (Newhouse, 1978; Wedig, Mitchell, and Cromwell, 1989).

Research focusing on the relationship between levels of payment and utilization of physician services indicates that physicians' choices are responsive to changes in financial incentives. For example, analysis of different states has shown that higher Medicaid fee levels as well as lower prevailing commercial fee levels are related to greater physician involvement with Medicaid (Cromwell, Mitchell and Sloan, 1978). There is concern that lowering Medicare fee levels under MVPS also could hinder access to and quality of care (Rice and Bernstein, 1990). Physicians might attempt to recover their revenue losses by increasing the volume of services to patients with higher payments per unit of service, such as those with commercial insurance coverage.

For some physicians, opportunities to substitute non-Medicare for Medicare revenues will be limited, however, and they might increase the volume and intensity of services to their Medicare patients (i.e., "induce demand"),

so that their historical ("target") income levels and standards of living are not reduced along with fee levels. Wage and price controls imposed between 1971 and 1974, and the physician fee freeze in effect during the mid-1980s, created two natural experiments in which researchers observed the relationship between fees and total expenditures. During both periods, despite limits on the level of fees, total expenditures rose substantially (Gabel and Rice, 1985; Wedig, Mitchell and Cromwell, 1989). Those findings were interpreted as prima facie evidence of income targeting and/or demand inducement. Similarly, when Medicare physician reimbursement rates were adjusted within the State of Colorado, physicians with downward adjustments (i.e., those in larger urban areas) increased their intensity of services, and physicians with upward adjustments decreased the intensity of services provided to beneficiaries (Rice and McCall, 1982).

There is further direct evidence that the economic incentives given to physicians can affect their practice patterns. For example, a for-profit chain of clinics in Boston changed the way physician employees were paid, from a flat wage to a base wage with potential bonuses based on gross monthly revenues (Hemenway et al., 1990). That study compared 15 full-time physicians before and after the change, i.e., during the winter months of consecutive years (1984-5 and 1985-6). After implementation of the bonus provisions, increases were observed in the physicians' average patient visits per month, charges per visit, lab tests per visit, and x-ray films per visit.

Other evidence stems from differences among physicians who do or do not have direct financial incentives to provide certain services. For example, Hillman et al. (1990) found that, compared to other physicians, those with imaging equipment had significantly higher mean charges for patient episodes of care involving certain specific symptoms.

The relevance of this research to the issue of volume performance standards is its conclusion: physicians' behavior is responsive to financial incentives. Unlike area-wide mandatory VPSs, voluntary practice-specific VPSs may be used to create incentives for individual physicians that are consistent

with a willingness to avoid unnecessary services. Specifically, if standards are applied on a binding, voluntary basis to smaller numbers of physicians, the actions of each physician would have an appreciable effect on VI performance.

2.2 Aspects of Efficiency

The health care delivery system is often said to be "inefficient." Owing to the fact that physicians have authority over services that account for at least 70 percent of total medical care expenditures, policymakers must look to physicians to implement changes (Fuchs, 1975). But what is meant by efficiency, and what can physicians do differently to achieve it? At least three measures of efficiency are relevant to physician services under Medicare.

The first measure is technical or production efficiency, i.e., the average cost to produce a unit of service such as a diagnostic test or a particular type of office visit. The RBRVS is a large step toward having Medicare prices based on efficient production of service units. The other two measures of efficiency involve utilization levels, and thus pertain to demand as well as supply factors. Efforts to provide patients seen by a practice with efficient levels of care (both volume and intensity) constitute the second measure of efficiency, and are referred to as practice management in this report. The third measure of efficiency refers to the aggregate levels of service provided to patients by all providers. These efforts to achieve efficiency for all services are termed patient management in this report.

Thus, efficiency in the delivery of medical care requires at least that:

- 1) Physicians and other providers minimize the cost of producing each unit of service, such as an office visit, a procedure, or a diagnostic test;
- 2) Physicians and other providers properly control the number of service units that are provided to patients within a practice; and

- 3) Physicians and other providers do not duplicate services provided elsewhere for the same patients, and do not make unnecessary referrals to other providers.

An HMO with a closed system of providers and appropriate administrative mechanisms provides a good illustration of a comprehensive approach to efficiency. HMOs can make bulk purchases of supplies, directly manage combinations of capital and labor inputs, establish procedures and protocols for ambulatory care and restrictions for patients entering the system, and manage the flow of patients to different providers, including specialists and inpatient facilities.

The studies mentioned in the previous section, showing that physicians may increase the volume and intensity of services when it is profitable to do so, illustrate that differences in how practices are managed can affect service delivery. Luft et al. (1985) compared utilization rates for patients with selected diagnoses, all of which required essentially only ambulatory care, in 14 organizationally and geographically varied group practice settings. Statistically significant differences were observed across sites for similar diagnosed conditions. Variations across plans tended to be consistent across diagnoses, suggesting that the group practices differed systematically in terms of the efficiency of their practices. Perhaps there are organizational features in some group practice settings that help to shape patterns of care.

An experiment was carried out at the Cleveland Metropolitan General Hospital, testing the effects on utilization and costs of adopting certain "group practice" features in a clinic setting (Cohen et al., 1986). Residents and patients were randomly assigned to either the traditional clinic setting or to the experimental group practice setting. The new features included: 1) more frequent sessions per week; 2) house officers on duty for each session, working with a team of non-physicians; 3) cross-coverage among providers and 24-hour accessibility for patients; 4) a simplified patient

registration process; and 5) meetings to coordinate patient flow between the separate inpatient and outpatient providers. The results indicated similar ambulatory utilization rates and hospital admission rates, but lower hospital lengths of stay for the experimental group practice model.

These findings support a widely held view that patient management efforts have led mainly to documented reductions in inpatient hospital utilization. Indeed, management of the patient's entire scope of care has often focused on reducing expensive hospital service utilization. An overall finding emerges from the literature that prepaid plans reduce utilization, particularly utilization of costly inpatient services, in response to financial incentives (Manning et al., 1984). At first, PPOs concentrated almost exclusively on selective contracting with hospitals, and placed little emphasis on limiting participating physician panels (Rice, Gabel, and de Lissovoy, 1989). One may surmise that Medicare's experience with reduced hospital expenditures and increased ambulatory service costs represents initial success in managing the cost of the full benefit package.

Nonetheless, physicians have an active role in generating ambulatory service utilization. Analysis of data from the National Health Care Expenditure Survey showed that more than one-third (36%) of visits to a physician were initiated by physicians, by making appointments during a previous visit (DHHS, 1982). This percentage increased with the age of the patient. For example, 46 percent of visits were initiated by the physician for patients 55 to 64 years old.

Although prepaid group practices have offered the greatest empirical evidence of efficient practice and patient management, prospective payment systems by themselves are not enough. Organizations must extend the incentives created by the payment system to individual providers. Whipple (1981) offers several suggestions for doing this, such as taking away physicians' financial incentives to see every individual, and using non-physician personnel to screen patients. He warns not to expect significant,

continuing cost containment efforts "without the provision of endogenous, visible, and reasonable incentives."

2.3 Medical Practice Modes

Given the medical care delivery system in the United States, what opportunities exist for changing physician practice patterns? Eisenberg (1985) describes several methods for altering physicians' practice patterns: education, feedback, participation or involvement in setting practice norms, administrative rules (e.g., hospital pre-certification), financial incentives, and penalties. Undoubtedly, using some combination of these approaches would most likely yield the greatest success. What type of practice environment can implement programs designed to increase practice and patient efficiency? One form of entity that merits serious consideration is the medical group practice.

Consideration of policies directed toward physician groups is in step with a steady increase in both the number of physician groups and the proportion of physicians practicing in groups. Referring to data from the AMA Socioeconomic Monitoring System (SMS), approximately 60 percent of physicians were in group practice in 1987, a percentage that has risen steadily since 1975 (Wilke and Cotter, 1989). A separate AMA survey indicates that group size is increasing, from 7.9 physicians in 1975 to 9.6 physicians in 1988 (AMA, 1990). The proportion of physicians practicing in groups tends to be similar across states, and more than half of all new physicians are entering group practice. Moreover, group practices generate on the order of 30 percent of their revenues from Medicare, a figure large enough to suggest that Medicare policies could help to foster change in practice patterns.

Physicians establish and join group practices basically for three reasons: to share the fixed costs associated with a practice; to spread financial risk due to uncertainty, through some degree of revenue sharing; and to benefit from the visibility and reputation of groups. Sharing of revenues can be attractive to risk averse physicians when outputs are shared and when

members are jointly subject to market forces. Expanding the size of the group can be especially attractive when market forces are likely to have differential impacts on members (Gaynor and Gertler, 1990). There is quite a broad literature discussing, both theoretically and empirically, the interplay between group organizational properties and the behavior of individual physicians (Kimbell and Lorant, 1977; Newhouse, 1978; Frech and Ginsburg, 1974; Gaynor, 1990; Madison and Konrad, 1988; Kralewski, Pitt, and Shatin, 1985).

One conclusion that emerges from the literature is that group practice physicians can be more productive than solo physicians with respect to outputs measured as gross revenue, total patient visits and office visits. The optimal size of groups in terms of these production measures is rather small, in the range of 5 to 7 physicians. A second conclusion is that organizational goals and priorities can influence practice patterns. In group settings, it is possible to modify the incentives and behavioral responses that occur in the imperfect fee-for-service system (Whipple, 1981). Some empirical evidence of this stems from comparisons of large prepaid groups and fee-for-service groups (for example, Epstein, Begg, and McNeil, 1986).

Comparisons of utilization between fee-for-service group providers and prepaid group practice plans have generally found lower utilization rates among prepaid group practices. Fee-for-service group practices can probably establish at least some of the utilization control mechanisms employed by prepaid plans, particularly if they are given incentives to do so. In the private fee-for-service sector, for example, PPOs attempt to control costs through utilization review programs (Rice, Gabel, and de Lissoy, 1989). As group practice is becoming more widespread, directing incentives toward groups, for either cost control or other objectives, may be propitious.

As the prevalence of group practice has grown, consideration has also been given to the relationship between organization of practice and quality of care although research results in this area are inconclusive. Roos summarizes the literature pointing toward conclusions that physicians in multi-specialty

group practice might deliver higher quality services than solo practitioners (Roos, 1980). One explanation offered for higher quality among group practice physicians is peer review.

Continuity of care has been generally regarded as one facet of the quality of care. One indicator of continuity is having a specific physician as one's usual source of care (Aday and Andersen, 1975). Seeing several physicians in the same group practice almost certainly has different implications for continuity of care than, for example, seeing a variety of physicians in a hospital outpatient setting (Kasper and Barrish, 1982). As a result, the care setting might have implications for continuity and quality of care. Moreover, encouraging providers to manage patient care is consistent with quality care and beneficiaries' demonstrated tendency to utilize regular sources of care.

2.4 Summary

The literature leads to a conclusion that there are considerable variations in efficiency of medical service delivery. Economic incentives are a strong tool for generating more efficient practice patterns. Particularly when physicians coordinate their activities, such as in a group practice setting, there are opportunities to improve efficiency in three distinct ways: on a per unit of service basis; the number of services provided in a practice; and referral patterns among different providers and settings. Translating appropriate economic incentives to individual physicians into reimbursement systems for Medicare is the subject of the next chapter.

Chapter 3

ALTERNATIVE MODEL DESIGNS

3.1 Introduction

The point of discussing the link between economic incentives and physician efficiency in the previous chapter was to set the stage for possible reimbursement system models that embodied appropriate incentives. This chapter deals with conceptual and technical issues surrounding the development of reimbursement incentives in the form of separate VI targets for volunteering physician organizations.

The next section provides a conceptual overview of different perspectives on efficiency and the issue of beneficiaries enrolling with designated providers. The third section presents some basic model options for health plans with enrolled members (i.e., HMOs and PPOs), and for physician practices in the fee-for-service sector. Several topics are addressed in the fourth section: 1) potential refinements to the basic models, 2) issues surrounding how to set VI target rates of increase, 3) financial rewards and penalties, and 4) the effects on overall Medicare expenditure rates of allowing separate VI targets for volunteering organizations. The chapter concludes with a discussion of evaluation and operational issues.

3.2 Conceptual Overview

3.2.1 Efficiency Perspectives

Alternative models for voluntary volume performance standards can be described along two dimensions:

- o The scope of management implied by the services including in the VI measure, and
- o Whether beneficiaries are restricted in their use of providers outside of a designated panel.

The first dimension distinguishes between two basic approaches that physician practices can take toward improving efficiency of service delivery. The first approach is to improve efficiency through *practice management*, i.e., by reducing resource consumption within a given practice (including staff and office inputs, ancillaries, etc.). Services delivered by other providers are considered outside the purview of practice management. The second approach is to improve efficiency through *patient management*, i.e., by reducing patients' overall level and intensity of service use, both within and outside a given practice. For example, more efficient management of patients may occur by reducing the number and/or changing the pattern of referrals to specialists, and by avoiding duplicative services among different practices.

Some physician entities could manage the services provided directly within their practices, and also possess the knowledge to function as advisors or gatekeepers to other services provided to their patients. Thus, practice management and patient management are not mutually exclusive. However, in this context the efficiency of a physician or group is to be measured and there are financial incentives tied to the VI measure. The scope of services included in the VI measure should correspond in some reasonable way to the degree of control or influence over patients' utilization patterns that might be attainable by individual practices.

Even as practices can vary in their ability to manage patient care in the broader sense, so too VI measures can reflect more or less emphasis on services inside versus outside a given practice. Services provided outside the practice can be ignored in the VI measure (the pure practice management model), given equal weight to services inside the practice (the pure patient management model), or given some positive but lower weight. Selecting the relative weight for services outside of the practice would involve a trade-off between the breadth of incentives versus the risk perceived by providers trying to manage beneficiaries who are not locked into a network of providers. Which services to potentially include in the VI measure is also a question.

True patient management would imply incentives across a full range of services. However, MVPS includes only certain physician-related services.

A health plan with enrolled members can take relatively strong control over the full range of services provided. However, in the non-enrolled or fee-for-service sector, it is not possible to realize as much control over providers and services outside the practice. Some large multi-specialty fee-for-service group practices may provide the majority of services received by most of their patients. Such groups would have an organizational opportunity to closely monitor and exert some control over the utilization rates of their patients, through internal and external referral protocols, hospital utilization review, follow-up care, etc. In that case, it would be appropriate to establish VI measures that reflected a patient management perspective, although it may be necessary to shy away from giving services outside the practice equal weight to services provided within the practice.

Limitations on patient management are even greater for many single-specialty groups. A podiatry group, for example, would not be expected to exert significant control over the complete range of services delivered to their patients. They could, however, endeavor to manage their own time and other inputs to the practice more efficiently. In such a case, VI measures might be limited to services directly provided by the group.⁴

It may be useful to think of the two approaches -- patient management and practice management -- as the two sides of a transaction in which beneficiary reimbursements are made for services delivered. An expenditure for the payer (Medicare) corresponds to revenue for the provider. From Medicare's perspective, it would be desirable for providers to actively manage expenditures per beneficiary. However, fee-for-service providers are not automatically going to have that perspective. The scope of their authority, and hence the scope of their responsibility, in many cases will begin and end with their own practices.

⁴ An alternative for the group would be to link-up with other practices so that, together, a broader range of services are provided.

Whereas the payer moves from a fee for a beneficiary to total expenditures for the beneficiary, the provider moves from a fee for a service to total fees from all services. Thus, payers and providers can agree on a fee-for-service payment system and on a per capita payment system for enrolled members. Given the non-enrolled and fee-for-service nature of Medicare, a policy question is whether there are other payment alternatives that are acceptable to both the payer and provider. Moving to practice management is probably a more natural progression for fee-for-service providers, while the patient management model is more understandable for the fee-for-service payer.

3.2.2 Enrollment and Non-Enrollment Models

Medical practices can be affiliated with organized health plans that enroll members (e.g., HMOs), and/or can provide services to beneficiaries on strictly a fee-for-service basis. There are several types of health plans that enroll Medicare beneficiaries: HMO TEFRA¹ risk plans, HMO TEFRA cost plans, Health Care Prepayment Plans, and PPO Select Plans (demonstrations). Beneficiaries must make an active decision in order to join one of these types of enrollment model plans. Once a beneficiary is enrolled, coverage for services from providers affiliated with the plan generally is more comprehensive than coverage for services from providers outside the plan. If unauthorized services are received from providers outside the plan's network, coverage could be reduced (as in a PPO) or lacking (as in an HMO).

The vast majority of Medicare beneficiaries receive their medical services in the fee-for-service sector. Under fee-for-service non-enrollment models, no contractual relationship exists between the physician and the patient. The patient load of a fee-for-service practice varies continually, and is not defined by any specified enrollment population. Beneficiaries

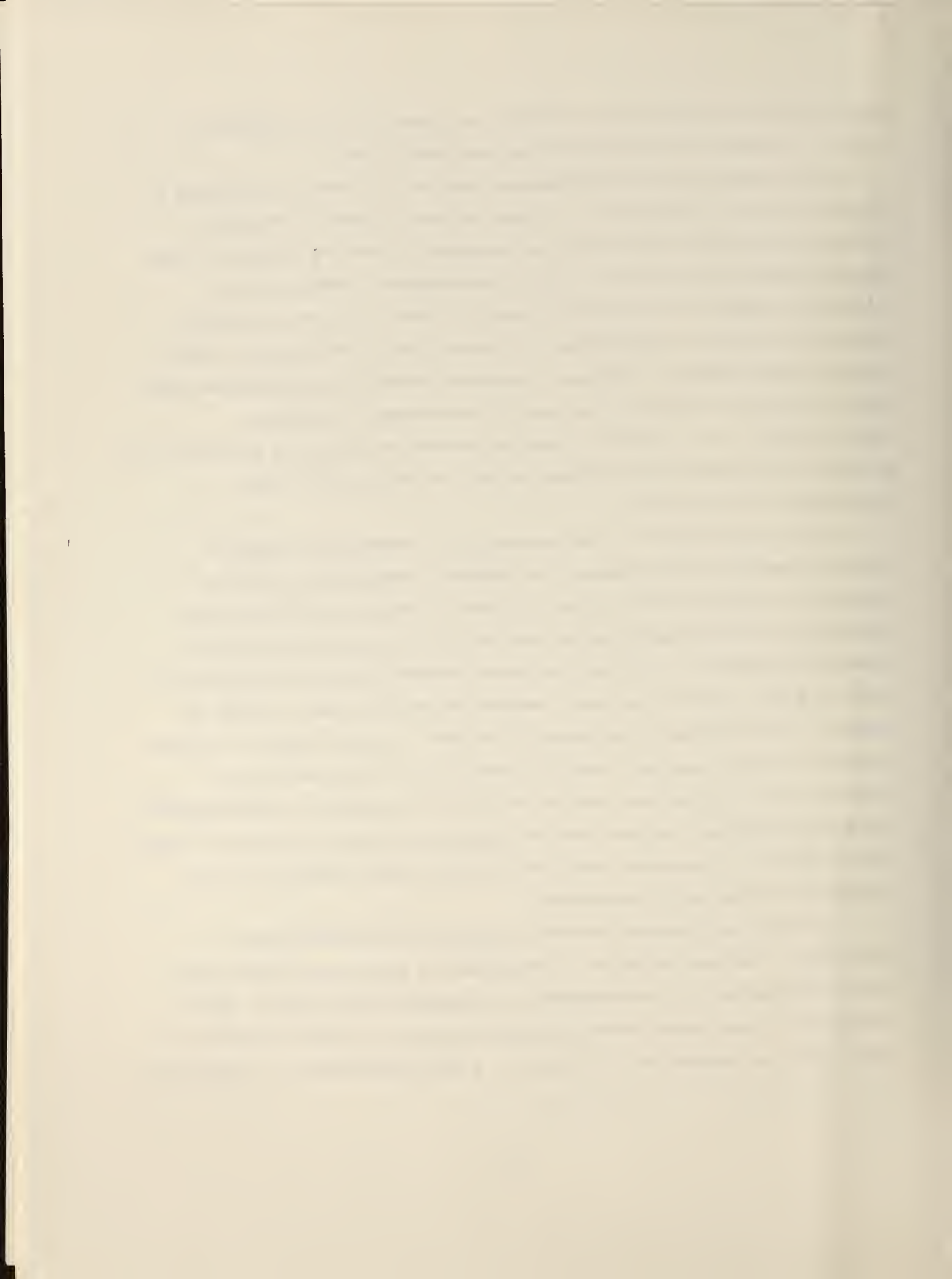
¹Tax Equity and Fiscal Responsibility Act of 1982 -- the legislation that enabled current Medicare HMO contracts.

retain freedom-of-choice among providers, and there are no differences in levels of coverage that occur under the enrollment models.

For the most part, delivery systems that enroll members will manage a comprehensive set of benefits. For them, all Part B services that are included in the national MVPS could be included in their VI measures. Some enrollment model plans may have a practice management perspective on efficiency, however, such as service-specific PPOs or exclusive provider organizations (EPOs). By extension, if these types of arrangements become available under Medicare, separate VI measures could be established for their scope of services, be they mental health, cardiology, orthopedics, rehabilitation, etc. Relevant volume performance standards for these types of providers would focus on the delineated sets of services for those beneficiaries who enrolled.

Not to be overlooked is the possibility of creating new types of enrollment models under Medicare. For example, beneficiaries could be required to designate their choice of primary care physician among local practitioners who are qualified and are willing to supervise their care. Volume and intensity of services for those providers could be evaluated in terms of a full range of services. Beneficiaries would need a reason to restrict their coverage to particular providers. Because offering extended benefits or lower copayments would be expensive and still may not be effective, this approach may require legislative mandates for implementation. For present purposes, however, such an approach may usefully begin with broad participation of physicians (solo practitioners and/or groups) evaluated according to their own VI performance.

Non-enrollment models represent conceptual and methodological challenges. The great majority of physicians in this country serve their Medicare patients on a non-enrollment or freedom-of-choice basis. In the absence of an enrollment process, questions arise as to which patients and which bills are appropriate to include in a given physician's VI performance.



Decision rules need to be established that summarize the multitude of fee-for-service transactions in terms of fair and reasonable VI measures.

Being for the most part outside of "managed care environments", the distinction between patient and practice management becomes much more important for beneficiaries who are not enrolled. Nevertheless, there may be some physicians or groups that are able to manage a substantial proportion of their patients' care. Groups that include a number of specialties or that follow patients through the hospital would be most likely to succeed with patient management.⁶ For those that are able, VI measures that include services outside the practice offer the greatest number of opportunities to improve efficiency at the patient level.

Substantial savings also could be generated by physicians who are motivated to manage their own practices more aggressively, even if they provide a small portion of total services received by their patients. For example, ophthalmologists could lower Medicare expenditures by managing their own practices, without necessarily affecting services delivered by other physicians. Lower costs per unit of service would result in savings to the practice, whereas lower volume and intensity of services per patient seen could result in savings to Medicare.

3.3 Basic Model Designs

The fundamental premise for each of the approaches for measuring VI discussed below mirrors that of the national VPS: the actual rate of change in service volume from one time period to the next is compared to an established target rate of change. The basic differences between the approaches surround the method for defining volume rates in each of the time periods. For enrollment models, which are dealt with first, relatively straightforward measures of volume per enrollee can be used. For non-enrollment models, which are dealt with subsequently, measures of volume per

⁶There is very little empirical evidence from which to conclude that per capita costs are related to provider group size. It is reasonable to expect, however, that patient management can be effective.

beneficiary seen are explored as one attempt to deal with the absence of the explicit information conveyed by enrollment.

3.3.1 Enrollment Models

One of the primary mechanisms for organizing the management of a broad spectrum of covered services is to enroll individuals in plans that are responsible for providing a specific set of medical services. There are several options currently operating in which Medicare beneficiaries may enroll. In principle, physician entities such as some multi-specialty groups could work out arrangements with Medicare in which beneficiaries enrolled in a new type of organization. The groups' volume performance standards could be based on the reimbursements associated with the enrolled beneficiaries. However, beneficiaries can be expected to give up freedom-of-choice only in return for improved benefits and/or reduced costs. It is doubtful that either providers or Medicare would expect financial savings to offset the cost of such incentives. As mentioned previously, it is conceivable as well that Medicare could mandate that beneficiaries designate a primary care physician.

Medicare beneficiaries can voluntarily come under the auspices of a managed care network of providers through alternative delivery systems. Enrolling beneficiaries in HMOs or PPOs facilitates the management of the full scope of their care, because the system of care is relatively closed and orderly. In the present context, advantages stem from the fact that the enrollment process makes it clearly understood which beneficiaries, and therefore which service costs, can be attributed to the provider entity (i.e., the plan).

If no option were established for organizations to volunteer for their own VI measures, presumably managed care systems under Medicare would be folded into the national MVPS. For risk HMOs, Adjusted Average Per Capita Cost (AAPCC) payment rates would reflect fee updates given to fee-for-service physicians. Adjustments to HMO payment rates would be independent of the HMO's own VI rates of increase because HMOs enrollees' actual utilization

experience is not included in development of AAPCC rates. For cost HMOs and HCPPs, account settlement presumably would include any penalties imposed nationally on fee-for-service provider fees by reducing final allowable costs per enrollee, although apparently actual policies are yet to be determined. Similarly, physicians affiliated with PPOs could see their fees reduced, along with other fee-for-service physicians, regardless of the actual VI rates of increase for physicians serving PPO enrollees. The following sections contain methods for using a voluntary VPS approach for health plans that enroll beneficiaries.

TEFRA risk HMOs

Currently, TEFRA risk HMOs receive capitation payments based on Medicare's projected per capita expenditures in the fee-for-service sector, i.e., the AAPCC. In the autumn, HCFA projects Medicare expenditure rates per beneficiary for the next calendar year. These projections are based on expenditure rates observed in the most recent claims data, and take into account changes in fee levels, utilization rates, Medicare benefits, etc. Thus, projected expenditure rates will reflect any fee penalties imposed on fee-for-service providers for past failures to meet volume performance standards. HMO payment rates, therefore, would also reflect fee penalties. A policy question is the extent to which risk HMOs should be penalized for inefficiency in the fee-for-service sector.

Permitting separate VI measures for risk HMOs would avoid payment rate reductions attributable to aggregate VI increases by fee-for-service providers. There are at least two basic approaches to handling VI rates separately in risk HMOs. One method would be to directly observe the volume levels within the plan for both the baseline and current time periods, and compare their difference to the target rate of change in volume. Future payment rates could be adjusted according to whether HMOs met their VI target rate of increase. This strategy underlies a proposed method for measuring VI in cost HMOs and HCPPs, which is discussed under that subheading. The other

method would be to pay risk contracting HMOs on the basis of projected fee-for-service reimbursement rates, net of any fee penalties imposed on fee-for-service providers for past failures to meet the VI target.

The latter method acknowledges that risk HMOs, by definition, absorb the cost of any excessive volume among their enrollees. From the perspective of the Medicare program, they are paid "target" expenditure rates up front; there are no "cost overruns" for Medicare with risk plans. Risk contractors therefore satisfy expectations regarding rates of volume increase.⁷ That approach would give HMOs a normal (implicit) rate of increase in physician reimbursements. As a way of operationalizing that concept, capitation rates would continue as if local fee-for-service physicians were receiving full updates to their fees, as regulated through the Medicare Economic Index.⁸

HCPPs and TEFRA cost HMOs

Under current contracts with prepaid health plans, payment rates are not determined by fee schedules and procedure codes, but by aggregate cost levels. Health Care Prepayment Plans (HCPPs) contract with HCFA on the basis of their actual per capita costs for Part B services. Similarly, HMOs with TEFRA cost contracts are paid on the basis of actual per capita costs for both Part A and Part B services. In this model, the target rate presumably would apply to Part B services included in MVPS.

Plans must estimate their revenue requirements per enrollee-month at the beginning of each year. On the basis of that estimate, HCFA makes interim payments to the plan. For HCPPs, bills for services under Part A are

⁷Volume increases within an HMO that are in excess of payment rate increases may lead to lower extended benefits or higher member premiums. The Adjusted Community Rate (ACR) governs this process and ensures that members are not charged more than the actuarial value of Medicare's copayments and deductibles.

⁸Fairness of payment to HMOs will still require that HCFA accurately project the USPPC. For example, if HCFA projects expenditure rates that "ought to occur" under allowable rates of increase, rather than what actually will occur, then HMOs would be underpaid relative to fee-for-service providers.

processed by Medicare intermediaries. At the end of the year, the plan must file a cost report that calculates the Medicare service costs per Medicare enrollee-month. A process of settlement is undertaken in which interim payments that were in excess of the final cost figure are paid back to HCFA, while supplemental payments are made to the plan in the event of underpayment.

Thus, in principle HCPPs and TEFRA cost contractors are paid on the basis of their cost experience under Medicare, as are fee-for-service providers. However, in the context of Medicare physician payment reform, questions need to be raised about how to determine payment rates under cost contracts. One set of questions arises as Medicare moves away from market based fees, and toward regulated fees under RBRVS. For example, in certain situations HCPPs are limited in reimbursement to the carrier screens, in which case the RBRVS fee schedule would automatically apply. However, the cost experiences of plans generally reflect their existing cost structure, in which physician payments are driven by market forces.

Another set of questions pertains to the rewarding of efficient volume and intensity of services, which for this study relates to volume performance standards. Assuming that the issue of appropriate prices is resolved,⁹ the cost experience of the plan in the prior year could be used as a baseline expenditure rate per member-month. A target rate of increase that incorporates the plan's allowable fee and volume increases (together or separately) will be added to this baseline cost figure.

Development of an appropriate target rate of increase will require adjustment for certain factors, since the proposed targets define performance in terms of expenditures per enrollee (rather than total expenditures). For instance, the portion of the target rate of increase under MVPS attributed to increases in the number of people eligible for Medicare would not be appropriate for measures of expenditures per beneficiary. Similarly,

⁹Services provided in the plan could be made subject to the RBRVS fee schedule, or recalculated by simulating RBRVS payments. Alternatively, expenditure targets could provide an aggregate limit on the product of price and volume changes, without isolating volume changes.

expenditure growth due to increases in national physician participation rates would not be necessary.¹⁰

The final cost report at the end of the year will produce the plan's actual performance for that period. A comparison of the projected (or targeted) experience to actual experience, where both are established using the same set of rules, will determine whether the plan met or exceeded its target rate of increase.

PPOs

PPOs differ from HCPPs and TEFRA contractors in that the basic method of payment is the RBRVS fee schedule rather than a payment rate per member-month. Thus, physicians serving beneficiaries under the auspices of a PPO will have payment rates determined in the same manner as other fee-for-service providers. With prices determined by Medicare, expenditure targets are equivalent to VI targets, as in the MVPS.

Another difference between PPOs and HMOs is that beneficiaries technically are not locked into the plan for coverage. The incentive structure built into the PPO plan presumably helps to attract beneficiaries to PPO providers at the point of service, but Medicare still faces a financial liability if other providers are chosen. The combination of an enrollment process and the comprehensive services arranged through the PPO network argues strongly for including a full range of services in the VI measure for the PPO, whether or not services were provided within the network. With that approach, an annual baseline figure for the PPO could be developed in which expenditures for PPO enrollees, for all providers seen, were divided by the number of PPO enrollee-months.

¹⁰Participation rates affect aggregate expenditures because participating physicians are allowed higher fees.

3.3.2 Non-Enrollment Models

Distinguishing features of non-enrollment models

The non-enrollment options could entail much less administrative complexity on the part of participating providers. There are no enrollment issues, supplemental benefits, member premiums, coordination of benefits, etc. From the standpoint of HCFA, however, there may be significant administrative burdens that could constrain the number of groups or physicians that can participate. Data processing requirements may limit the number of practices that it is feasible to monitor and evaluate. It may be too soon to know what that limit may be, because specific details about tapping (i.e., selecting in advance of receipt) and aggregating provider bills would need to be worked out. Criteria may need to be chosen by which to select volunteering organizations, such as a minimum number of beneficiaries served.

Other potential criteria for participation may include quality assurance or management control systems aimed at monitoring VI levels. These may include data systems, treatment policies and protocols, contractual arrangements with other providers, etc. A related administrative requirement for participating providers type of criterion is the development of specific formal ties among physicians in a group. At a minimum, this will likely entail billing Medicare only through the auspices of the volunteering organization.

It may be difficult to predict how the provider community will respond to the opportunity to operate under separate VI targets. Generalizations from existing data on group composition will probably be incomplete because new arrangements could be developed. Potentially useful voluntary groupings may arise from existing organizations such as group practices, medical societies, hospital and clinic staffs, specialty associations, or physicians belonging to a common referral network.¹¹ In every case, individual physicians will need to agree to participate in the voluntary entity, and all Medicare business for

¹¹The formation of voluntary groups under the auspices of trade groups may be viewed as anti-competitive and violate anti-trust laws.

participating physicians must be attributed to that entity. Splitting a practice inside and outside the entity could lead to opportunities for manipulating VI measures. For example, a physician could decide how to distribute patients across practice settings in order to influence apparent VI performance.

Unless beneficiaries are required to designate primary care providers, deciding which beneficiaries' bills are to be associated with a given organization's VI measure will need to depend on actual service utilization patterns. Thus, beneficiaries who do not use Medicare services will not be counted in VI measures. This contrasts with the situation involved with HMOs and PPOs, in which an enrollment process identifies beneficiaries with the health plan, and VI (or expenditure) rates are computed on the basis of member-months.

Measuring volume of services

In fee-for-service medical practices generally, there can be no presumption that solo physicians or groups can or will provide most or all services to their patients. During any given year, beneficiaries can visit providers in more than one practice. It therefore becomes necessary to establish methods for attributing beneficiaries and bills to distinct medical practices.

In this study, VI measures for non-enrollment model practices are computed as Medicare reimbursements per beneficiary seen. The reimbursements counted in that ratio depend on the choice of whether to measure VI for services within the practice only (i.e., the practice management model), or whether to also count services for patients provided in other practices (i.e., the patient management model). In either case, the sum of reimbursements would be divided by the number of different beneficiaries seen during the year. In other words, each beneficiary receiving any Medicare benefits from the practice would be counted as a patient, regardless of the actual volume of services per patient.

For example, a practice that has seen 800 beneficiaries during the year and received \$400,000 in Medicare reimbursements would have a volume or expenditure rate of $\$400,000 \div 800 \text{ patients} = \$500 \text{ per patient}$, under the practice management approach.¹² Under the patient management approach, reimbursements to other practices would also be counted. Assuming that about half of all services to these patients were provided within the practice, the VI rate for the patient management approach would be $\$800,000 \div 800 \text{ patients} = \$1,000 \text{ per patient}$ (with equal weight given to services outside the practice). A figure somewhere between \$500 and \$1,000 would be obtained if services outside the practice were given a partial weight.

This type of calculation would have to be made twice in order to evaluate volume performance, if an approach analogous to the current MVPS were taken. In other words, the VI rate for a baseline period (e.g., the prior year) would be compared to the VI rate for the current period (e.g., the current year).¹³ For example, a practice with an expenditure rate of \$500 per patient last year could be observed to have a rate of \$500 per patient again this year, even if the number of patients seen changed. The rate of change in expenditures per patient, in this example zero percent, would be compared to the target rate of change established for the practice, which could be based on the national target set by Congress for that year under MVPS.

¹²Recall that under RBRVS, reimbursements and volume/intensity are essentially equivalent measures since they are related by the constant conversion factor.

¹³Using a baseline measure based on the experience of a practice is chosen here as a starting point for exploratory purposes. Other types of targets could be envisioned, such as group norms based on similar practices and patient mixes. Alternatives will need to be studied, but are beyond the scope of this initial report.

3.4 Issues Related to Evaluating Volume Performance

3.4.1 Potential Model Refinements

Certain refinements or adjustments could be made to improve the accuracy and/or reliability of the VI rate estimates. Three areas of possible refinement are briefly discussed in this section:

- o Instability in VI estimates due to stochastic factors associated with patient outliers,
- o Changes in the average health status of patients over time, and
- o Differences in the extent to which patients see providers inside versus outside the volunteering organization.

Instability due to outliers

Utilization and expenditure levels are unevenly distributed across individuals. Some beneficiaries use very little medical care in the course of a year, while a minority use very large numbers of services. The incidence rate of high users, particularly in a small patient base, can have a substantial effect on the average volume and expenditures for that practice.

One way to reduce the adverse effect of variations of incidence in any given year would be to pool data across years. That is, more data points could be used in calculating VI rates. Adding more than one year's worth of data to VI estimates is a question of research and operational feasibility. Using a period other than one year, however, would add complexity to the volume performance standard, since the MVPS compares performance for back-to-back years. This approach would also dilute economic incentives associated with VI targets for any given year.

Another way to reduce the effect of outliers would be to stipulate a range of reimbursements per patient that are to be considered when making the estimates. For example, reimbursements above some cut-off point, say \$3000 or two standard deviations above the mean, could be ignored in the calculations. Similarly, patients with fewer than, say \$50, could be dropped entirely from the calculations. Both of these methods would de-emphasize the "tails" of the

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distribution of reimbursements per patient seen, and reduce variability in the VI rate estimates.

Adjusting for health status changes

With patient bases that are subject to continual change, fee-for-service practices in particular may find that the relative health status of their patients may differ from year to year. Differences can stem from changing health status over time of particular patients, infrequent use of services by some patients, the introduction of new patients, etc.

Variations over time in VI rates per patient seen by a practice may be reduced in part by adjusting for variations in average health status of the patients seen. If volume performance is based on a comparison of VI rates over time within the practice, only changes in average health status might be of concern. For the patient management model, health status adjustments would be needed for a wide range of services. For practice management, it would be necessary to ascertain the selected consequences of health status for expected reimbursements in particular specialties or settings.

Services inside versus outside the practice

The ability of a practice to manage the care of patients seen is partly dependent on the extent to which beneficiaries choose to receive care from that practice. Health plans that enroll beneficiaries can establish rules for benefit coverage that discourage or effectively preclude beneficiaries from getting services outside the plan. Fee-for-service medical practices, however, have no tangible reins on patients.

Estimates of average VI rates per patient can be refined to account for the control a practice might have on services delivered within, and the relative lack of control over services delivered outside the practice. That could be accomplished by counting patients' services with unequal weights, e.g., each in proportion to the amount of all services received that were provided by the practice. In mathematical terms, this would be "weighting"

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the experiences of each patient by the fraction of services received in the practice. Beneficiaries who receive a larger proportion of their care within a practice would contribute relatively more to the ratio than beneficiaries who receive less of their care within the practice.

With patients weighted in this way, the VI estimates would tend more to reflect the services of patients more involved with, and therefore potentially managed by, the practice. For example, a multi-specialty group practice could provide most or all services to many patients, and see other patients for only a fraction of their total care. In such a case, the VI measure would be dominated by the patients receiving the majority of their care in the practice.

The concept of weighting can be extended so as to exclude or include in the services delivered to certain patients seen by the practice, based on specified criteria. Perhaps only patients who receive more than 25 percent or 50 percent of their care in the practice would be counted in the VI measure. All other patients would be excluded or ignored in the calculations. That would further emphasize the patient management perspective on volume control, and might limit application of the model to primary care or multi-specialty groups that provide the bulk of services to patients seen.

3.4.2 Setting a Target Rate of Increase

Under the MVPS, aggregate Part B expenditure totals will be projected for the following calendar year. HCFA will base these projections on Medicare beneficiaries' historical and current expenditure rates, allowing for changes in inflation, the total number of Medicare beneficiaries, the age distribution of beneficiaries, technology, and applicable laws and regulations. The projections are reduced by a statutory performance standard adjustment factor that is limited by default to two percent per annum. However, Congress can choose a larger adjustment factor in any given year.

For volunteering organizations, there are conceptual disadvantages to setting targets based on total volume of service for those physicians, without

regard to productivity (such as the number of patients seen). A simple measure of aggregate volume or Medicare revenue would set implicit limits on expansion of the practice. If a practice were to see more patients in the current period than in the baseline period, it would be virtually impossible for the practice to meet a performance standard based on aggregate Medicare volume. VI measured on a per beneficiary basis would permit practices to expand by increasing their patient base.

Unfortunately, there are explicit trade-offs involved with basing the target of a practice on its historical experience. Specifically, practices that have been practicing efficiently already, i.e., during the baseline period, will have a lower target than practices that have been less efficient. "Experience rating" locks in the differential in expenditure rates that predates the effect of efficiency incentives. Addressing this problem by compressing the distribution of targets (i.e., pushing high rates down and low rates up) could have perhaps even more distressing effects: practices with sicker patients would have unrealistically low targets; moreover, practices with sicker patients or practices that are manifestly inefficient would have little incentive to volunteer. Given those considerations, and the fact that the MVPS would make global fee updates without regard to individual physicians' differences in volume performance, the option of uniform percentage rates of increase across practices may be preferable.

Adapting rates of increase under MVPS

The national rate of increase under MVPS is an important reference point for volunteering organizations' target rates of increase, but it would be adapted in two ways. First, it would be transformed into a per beneficiary measure by eliminating certain adjustments to the total, such as the number of eligible beneficiaries and the number of Medicare participating physicians (who receive higher reimbursement rates). Second, the per beneficiary target developed from MVPS might be adjusted according to local changes in input prices, or cost of practice. Failure to do so would make standards for

volunteering organizations too low in higher cost areas, and too high in lower cost areas.

Differential rates across specialties

The MVPS includes nearly all Part B services that are generally provided by office-based physicians. Therefore, defining targets that are closely based on the MVPS might be appropriate for practices measured from the patient management perspective (i.e., including patients' Part B services outside the practice). Additional complexities may arise for measurement from the practice management perspective (which are more likely to encompass only certain specialties and a subset of services and procedures). In general, it would be worth exploring in future research whether differential rates of increase in VI are likely to be significant under RBRVS and the MVPS. If so, the per capita rate of increase implicit for each category of service in the MVPS might be applied selectively to the practices according to their specialty composition. This problem also would arise for separate mandatory targets for different specialties.

3.4.3 Rewards and Penalties

A key aspect of voluntary VI standards has to do with the rewards and penalties associated with meeting, or failing to meet, VI targets. In general, volunteering would presuppose an expectation of greater financial rewards, compared to the national aggregate experience. There are two general guidelines that must be adhered to when developing the system of rewards and penalties: the financial consequences of performance must be fair and equitable for each practice or combination of practices; and financial outcomes must be budget neutral with respect to outcomes under MVPS.

Consequences for volume performance for voluntary organizations with separate VI standards could be made to resemble the legislative and regulatory guidelines in place for the MVPS. If the actual increase is equal to the targeted increase, then normal fee updates are given to physicians in the

practice regardless of the performance of the nation as a whole. If the actual increase was less than the targeted increase, then the difference would be added to the fee update; if more than the targeted increase, the difference would be subtracted from the normal fee update.

There are alternatives to this approach that might be considered in future research. For example, Medicare could withhold some portion of payments to providers and keep that amount if the VI standard were exceeded. If providers met their target, then Medicare might return the amount withheld and offer financial bonuses based on the actual performance. In this way, rewards and penalties would mirror common incentive systems within PPOs and HMOs.

To promote more widespread participation, it may be worth lessening the financial consequences of exceeding the target rate of increase. Toward that end, risk corridors may be introduced that limit the fee penalties (e.g., to two or three percent as in the MVPS). At the extreme, voluntary practices could be "held harmless" from excessive rates of increase. Such an approach might be worthwhile as an inducement for practices to volunteer. Perhaps practices could be held harmless for the first year or two, during which failure to meet the target would cause physicians' fee levels to be adjusted according to the national experience.

If a group practice decides to "disband" or not to volunteer in the following year, there perhaps ought to be two results. First, the individual physicians who comprise the group will receive fee updates that reflect the outcome of the organization for the relevant time period. Second, those physicians would not be permitted to form or join another group, individually or collectively, for a period of time such as three years. This would prevent "revolving door" patterns in which providers could regularly redetermine their baseline rates while operating under the MVPS.

3.4.4 Budget Neutrality

The law requires that Medicare program costs do not increase as a result of an option for voluntary VI standards. In fact, the intent of the voluntary program is to give individual physicians financial incentives to control volume. If the option is widely adopted, the program could save Medicare a substantial sum. Such incentives for individual physicians do not exist in the national MVPS.

Theoretically, the question of budget neutrality could depend on possible alternative scenarios. If volunteering organizations receive normal or relatively large fee updates solely because their targets were artificially high (e.g., they self-selected according to expected favorable circumstances), then budget neutrality would require that fee updates for other physicians be lower to offset the overpayment. However, if volunteering organizations earned higher updates by controlling VI, then Medicare would reap financial benefits. Those fee updates would in fact be "paid for" already through lower volume and lower total expenditures this year. No offsetting penalty would need to be imposed on the residual physicians under mandated targets. Interpreting outcomes in terms of the latter hypothesis (i.e., that lower volume was actually obtained) in part depends on the accuracy and stability of individual performance targets. It may be impractical to ascertain retrospectively whether targets were set too high, and therefore necessary to assume that volunteering organizations met their targets because of enhanced efficiency.

3.5 Evaluation and Operational Issues

Criteria for evaluating the option for separate VI standards would incorporate cost and efficiency, beneficiaries' access to needed care, quality of care, providers' participation and acceptance of the program, and administrative requirements. It would be critical to compare outcomes under an option to volunteer with the alternatives for controlling volume, including the MVPS as currently configured.

Potential unintended consequences should be identified and compared to the possible outcomes of other approaches. Issues that are not relevant to the MVPS, for example, allocating individual bills to different provider entities, must be addressed adequately if the rationale for a voluntary option is to survive. In this regard, a number of concerns have been raised by the Physician Payment Review Commission (1990).

The concerns highlighted by the Commission are whether this system will induce cost savings through efficiency or patient selection, whether access to care for seriously ill beneficiaries will be endangered, or whether quality will be adversely affected. Also, because this is a voluntary option, it needs to be evaluated in terms of its fairness and attractiveness to providers. Thus, patient selection, as well as selective patterns of provider participation, need to be considered.

Unlike the national MVPS, specific targets give physicians incentive to control the volume of services. Natural questions therefore arise as to whether sicker beneficiaries will experience disproportionate reductions in access to care. In that regard, the incentives are not likely to be so strong as to be jeopardize patient care, but they are consistent with policy goals to reward efficiency. Referring out certain patients in order to lower expenditure rates would help a practice to meet its target and achieve slightly higher fee levels two years later, for example. However, incentives to do so would be weighed against foregone revenues this year and a lower baseline VI rate for the coming year.

The administrative feasibility and cost of implementing separate VI standards must be addressed further. The capabilities and limitations of HCFA administrative files and data processing need to be thoroughly investigated in light of the demands created by separate targets. Operational details of the models will need to be adapted accordingly.

The patient management model would require that HCFA identify all bills (regardless of provider) that were generated by beneficiaries seen even once by a volunteering organization. Furthermore, if a weighting scheme is used,

the fraction of services provided within the practice to each beneficiary must be calculated. With the practice management model, a simpler aggregation of all bills generated by the practice might be required.

It may be much less practical to retrieve bills retrospectively than to tap them prospectively. Therefore, an example of an accommodation to administrative requirements might be that bills for individuals may be counted only after the first visit to the particular practice during the observation period. For example, if a beneficiary first sees a physician at a given practice on March 1, it would be easier to identify and keep track of that person's bills from that date forward, rather than striving for complete data for the calendar year (i.e., retrieving all of the patient's bills between January 1 and March 1, as well as the rest of the year).

Even with prospective taps placed on bills associated with patients seen by a practice, there are likely to be real limits on the number of separate VI measures it is practical to monitor. Especially if volunteering organizations perceived small risks in doing so (e.g., if they were grouped under the national MVPS if their own target were exceeded), then a large number of provider entities may volunteer. The perspective that focuses on managing practice costs and physician practice revenues would not appear *a priori* to require a minimum number of physicians within a group. Physicians, including solo physicians or specialists, could be included in this approach. Because of the large potential number of volunteer providers, the technical constraints on how many groups with separate VI measures could be operationalized need to be anticipated.

Chapter 4

EMPIRICAL ANALYSES

4.1 Introduction

The previous chapter discussed measurement of volume performance for two types of non-enrollment models under a voluntary component of the MVPS. In order to help assess these proposed models, this chapter provides empirical information on the Medicare service provision patterns of actual Medicare physician practices, and on patterns in beneficiary utilization of various physician practices.

There is a paucity of empirical evidence about service delivery to the Medicare population by physician practices. Little is known about the amount and mix of services group practices provide to Medicare beneficiaries relative to solo practitioners. Similarly, little empirical information exists about the propensity of Medicare beneficiaries to exclusively utilize the services of a single medical practice versus multiple practices during a year. This chapter fills some knowledge gaps regarding Medicare service delivery patterns, and provides some information on issues related to the alternative non-enrollment models explored in this study.

Discussed in the following section are the data sources employed for analysis, the limitations of the data, and the steps that were taken to minimize those limitations. The third section presents the research questions addressed in the empirical analysis, the methods employed, and the findings.

1920

The following is a list of the names of the persons who have been elected to the office of Mayor of the City of New York for the year 1920. The names are listed in alphabetical order of their surnames.

1. John P. Hylan
2. James C. McLaughlin
3. William J. Gaynor
4. John A. B. Smith
5. Charles F. Murphy
6. George W. B. Smith
7. John D. B. Smith
8. William J. Gaynor
9. James C. McLaughlin
10. John P. Hylan

4.2 Data

4.2.1 Data Sources

Three major sources of data were used:

- o The 1987 and 1988 Part B Medicare Annual Data (BMAD)-III Provider files with matched unique physician identifier numbers (UPINs),
- o The 1987 and 1988 BMAD-IV Beneficiary files,
- o A 1988 BMAD Provider Summary file derived from the 1988 BMAD Provider file.

BMAD Provider file

The BMAD Provider file contains all claims for a calendar year that were reimbursed by Medicare carriers for a 5-percent sample of physicians and suppliers.¹ Carriers select their samples on the basis of Medicare provider numbers, which identify medical practices for reimbursement purposes. A provider number can be assigned to a single physician or to multiple physicians. Moreover, physicians may bill Medicare under more than one provider number, for example if some patients are seen in a group practice setting and others are seen in a solo practice. There is a single charge profile and fee structure for all billing under a single provider number.

Each carrier's sample for a given year is comprised of all provider numbers in its sample for the previous year that are still active, i.e., that billed the carrier during the year. Inactive provider numbers are dropped from the sample. The 5-percent sample is completed each year by randomly selecting new provider numbers to replace the ones that were dropped.

A "unique physician identifier number" (UPIN) variable was matched to the claims in the BMAD Provider files used in this study whenever the UPIN and

¹Claims processed after March of the subsequent year are omitted from the provider and beneficiary files.

the provider number were identical. The UPIN is associated with individual physicians, and therefore will not correspond to any Medicare provider number used by a physician group. Rates of successful matches, defined as the fraction of claims with identical Medicare provider numbers and UPINs, varied considerably among carriers. These match failures could not be used to identify group practices, however, since no UPINs could be matched, even for solo practitioners, for a relatively large number of carriers. Hence, the UPINs could only be used to identify solo physicians (i.e., successful matches) that were falsely labeled as being group practices from the BMAD data fields.

BMAD Beneficiary file

The BMAD Beneficiary file contains all claims for a calendar year that were reimbursed by Medicare carriers for a 5-percent sample of aged beneficiaries.² Carriers select their samples on the basis of the last two digits of beneficiaries' Health Insurance Claim (HIC) identification numbers. Since the same selection criterion is used every year, the same beneficiaries will be included from one year to the next, as long as they are eligible for Medicare.

The 1988 BMAD 5-Percent Provider Summary file

A summary file created by HCFA researchers from the 1988 BMAD 5-Percent Provider file was used in selected analyses and for selection of a sample of providers whose claims were retrieved from the complete BMAD files for 1987

²The file also contains non-aged beneficiaries (disabled and end stage renal disease), but these were eliminated from this study.

and 1988. This summary file was derived by aggregating claims for over 48,000 Medicare physicians and suppliers on the basis of unique combinations of: carrier number, Medicare provider number, provider specialty, and provider type (solo, specialty group, etc.). Multiple observations for the same provider number occur in this file because a physician can designate different specialties in different localities. Here, multiple observations for a single provider were aggregated yielding a single provider observation.³

4.2.2 Limitations of the BMAD Data

The BMAD files have several limitations that make it difficult to reliably identify group practices. First, several BMAD data fields that could be used to identify single and multi-specialty group practices are simply not reliable. BMAD provider files contain three data fields of particular interest: a provider type variable with code numbers for solo practitioners, multi-specialty group practices, and single-specialty groups; a variable with the reported number of different physicians billing under the same provider number; and a multi-specialty code for group practices with physicians of two or more specialties billing under the same provider number. For claims with successful matches, UPINs were also included.

Unfortunately, these fields often contain conflicting information. For example, some provider numbers were designated as solo practices, but also given the "multi-specialty" practice code. Others were designated as multi-

³ A large portion of the providers with multiple records were already designated as a multi-specialty clinic in their specialty code. The aggregate record of these providers and specialty groups with multiple records were recoded as multi-specialty groups. The few solo physicians with multiple records were assigned to the specialty with the greatest reimbursements.

specialty practices in the provider type variable, but also as "single-specialty" practices.

A second limitation is that information available to Medicare may be distorted. For example, physicians in a true multi-specialty group practice may bill Medicare under separate provider numbers, as solo practitioners or single-specialty groups. Situations such as these may account for some of the apparent unreliability or conflicting nature of some data fields. This type of shortcoming should be rectified in the future with the addition of UPINs to all Medicare claims data.

A third limitation is the need to analyze reimbursements rather than volume of services. Under MVPS there will be a direct relationship between reimbursements and service VI due to the structure of the fee schedule and conversion factors. This relationship is muddled in the current system based on charges. Moreover, units of service are often coded using different measures (e.g., minutes or visits). As a result, a pure volume measure was not used for this study.

4.2.3 Addressing the BMAD Data Limitations

The provider type variable in the BMAD provider files recognizes several different categories, including solo practice physicians, clinics, and groups.⁴ BMAD instructions to carriers define clinics as an association of physicians with at least two different specialties with uniform charges for the same procedure, and where request for payment is submitted only in the clinic's name and provider number. Under this definition no "clinics" should

⁴Other types of providers include suppliers, institutional providers, and independent labs.

have a specialty code that pertains to a single specialty, and are interpreted here as multi-specialty groups. Groups are defined by Medicare as an association of two or more physicians of the same specialty with uniform charges for the same procedure. This provider type is interpreted here as a single-specialty group practice, and accordingly should not have a multi-specialty code. Solo physicians bill for services in their own name.

A cross-tabulation of BMAD Summary file data on specialty by provider type showed that for the great majority of providers, specialty codes were consistent with provider types. However, to reduce the chances of misclassifying providers, providers with consistent specialty and provider type were defined as either:

- o Solo physicians with a "non-clinic" specialty,
- o Multi-specialty physician groups with a "clinic" specialty,
- o Single-specialty physician groups without a "clinic" specialty.

All other practices (less than 7 percent of the sample) were assigned to a residual group where provider type was ambiguous. Suppliers, determined on the basis of their specialty codes, were dropped from the analyses.

Consideration was given to using the variable representing the number of different physicians billing under a provider number as an additional screen for required consistency among BMAD fields. For example, a provider number used by multiple physicians should not be coded as a practice with one physician. However, unreliable data precluded its use for this purpose. More than one-third of all practices were coded as having zero physicians. Moreover, reclassifying these providers into the residual ambiguous group would have taken away nearly 60 percent of the multi-specialty providers. On

the other hand, UPINs were used to further screen out a relatively small number of providers that were erroneously classified as either a clinic or specialty group.

4.3 Research Questions, Methods, and Empirical Findings

This section contains the research questions, the analytical approaches taken, and the findings relating to three areas of inquiry:

- o Medicare provider characteristics,
- o Provider delivery patterns and features relevant to a practice management model,
- o Beneficiary utilization patterns relevant to a patient management model.

4.3.1 Medicare Provider Characteristics

4.3.1.1 Research Questions

The first questions addressed empirically in this study pertain to the numbers and sizes of medical practices, especially group practices, serving Medicare beneficiaries.

- o What is the current composition of Medicare providers with respect to organization of practice (group versus solo)?
- o How large are the aggregate Medicare revenues of providers typically, and how are providers distributed with respect to size of their aggregate annual Medicare revenue?
- o How do the specialty distributions of single-specialty Medicare group practices compare with solo physicians?

The scope and volume of Medicare services by provider type may be of particular interest for assessing possible provider participation patterns with regard to separate VI targets. For example, it is unlikely that a provider would find it worthwhile to be monitored separately unless Medicare revenues were large enough to account for a significant fraction of its

practice revenue. Furthermore, the size of aggregate Medicare revenue for providers is of additional importance because separate targets may be feasible only for providers serving larger numbers of Medicare patients.

The relative size distribution of practices with respect to their annual aggregate Medicare revenues would suggest the proportion of Medicare reimbursements potentially involved if the largest practices were to volunteer. For example, Kowalczyk and Harden (in press) recently found that about half of Medicare reimbursements to solo practitioners for medical, surgical and consultation services were to 10 percent of those providers. If a similar pattern is found for all practices, then encouraging the largest practices to volunteer could affect a significant fraction of Part B expenditures.

4.3.1.2 Empirical Findings

The above research questions were addressed through simple descriptive analyses of the 1988 BMAD Provider Summary data. The findings are presented in this section.

Specialty distribution by provider type

Characteristics of medical practices included in the 1988 BMAD Provider Summary file are presented in Table 4.1. Almost two-thirds (64 percent) of practices in the sample are solo practitioners, 26 percent are single-specialty groups, three percent are multi-specialty groups, and 7 percent are classified as "other" due to inconsistencies in the data.

The data do not reveal large differences between solo and single-specialty group practices with respect to five broad categories of physician

Table 4.1

**PHYSICIAN SPECIALTY DISTRIBUTION BY TYPE OF PROVIDER GROUP
(n=37,259)**

<u>Physician Specialty</u>	<u>Solo</u>	<u>Single- specialty Group</u>	<u>Multi- specialty Group</u>	<u>Other[*]</u>	<u>Total</u>
Primary Care Specialties	7,186(30%)	2,806(29%)	0(0%)	365(14%)	10,357(28%)
Medical Specialties	7,720(32%)	2,855(29%)	0(0%)	1,227(46%)	11,802(32%)
Surgical Specialties	6,099(25%)	2,509(26%)	0(0%)	393(15%)	9,001(24%)
Multiple Speciality	0(0%)	0(0%)	911(100%)	65(2%)	976(3%)
Other	2,929(12%)	1,560(16%)	0(0%)	634(24%)	5,123(14%)
Total	23,934(100%)	9,730(100)	911(100%)	2,684(100%)	37,259(100%)
% of Providers	(64%)	(26%)	(3%)	(7%)	100%

^{*} This includes practices with invalid or inconsistent provider type and specialty identifiers.
Empty cells for other provider types reflect recoding into this residual category.

Source: 1988 BMAD Provider Summary file

specialties: primary care, medical, surgical, multi-specialty, and other.⁵ A little more than one-quarter of solos and single-specialty groups were designated as primary care specialists; similar proportions were found for medical and surgical specialties. There is no information about the actual specialties represented in multi-specialty groups. Practices falling into the ambiguous "other" provider type category were more likely to have a medical specialty (46%) or "other" specialty (24%), and were less likely to have a primary care specialty (14%).

Distribution of Medicare reimbursements by practice

Table 4.2 shows the top ten percentiles of reimbursements to practices as reflected in the 1988 BMAD Provider file. The distribution of aggregate reimbursements to practices is highly skewed, with the top percentile of providers averaging \$943,794 and accounting for 21.9 percent of all reimbursements. This drops sharply for practices in the lower percentiles, with the second highest percentile receiving just 8.2 percent of reimbursements. Moreover, practices not in the top decile had mean reimbursements of \$20,214 and received just 42.6 percent of all reimbursements.

Table 4.3 contains the distribution of provider types in the highest and lowest decile when practices are ranked by their reimbursements. Although multi-specialty groups comprise only a small proportion of providers in both the highest and lowest deciles, multi-specialty groups appear to be mildly

⁵ Primary care specialties are defined here to include general practice, family practice, internal medicine, obstetrics-gynecology, and pediatrics. Medical and surgical specialties were assigned in accordance with conventional classifications.

Table 4.2

PROVIDERS RANKED BY PERCENTAGE OF REIMBURSEMENTS RECEIVED
(n=37,266)

<u>Provider Percentile</u>	<u>Percent of Reimbursements</u>	<u>Cumulative %</u>	<u>Mean Reimb.</u>	<u>Std. Dev.</u>
99	21.9	21.9	\$943,794	\$946,481
98	8.2	30.1	352,036	42,933
97	5.8	35.9	248,013	20,945
96	4.5	40.4	193,833	10,822
95	3.8	44.2	163,158	7,141
94	3.3	47.5	141,541	5,869
93	2.9	50.4	123,839	4,736
92	2.6	53.0	110,523	3,311
91	2.3	55.3	99,297	3,189
90	2.1	57.4	89,610	2,488
<90	42.6 %	100.0 %	20,214	--

Source: 1988 BMAD Provider Summary file

Table 4.3

PROVIDER TYPE DISTRIBUTION IN HIGHEST AND LOWEST DECILES

	<u>Frequency</u>	<u>Percent</u>
<u>Highest Decile</u>		
Solo	2,367	63.5%
Single-specialty group	958	25.7
Multi-specialty group	203	5.4
Other	199	5.3
<u>Lowest Decile</u>		
Solo	2,041	58.3
Single-specialty group	1,030	29.4
Multi-specialty group	78	2.2
Other	352	10.1

Source: 1988 BMAD Provider Summary file

overrepresented in the upper percentiles of the ranked provider distribution. This is consistent with their higher mean level of reimbursements. Mean aggregate reimbursements for multi-specialty groups, single-specialty groups, and solo providers were \$110,806, \$39,810, and \$30,730, respectively.

More striking is the rather small difference in the distributions of provider type for the extremes of the size distribution. The data do not substantiate an intuition that the proportion of solo providers would be inversely correlated with rankings by aggregate reimbursements.

In the BMAD Provider file are a large number of providers with low aggregate Medicare reimbursements. Physicians practicing in multiple settings likely contribute to this. Cowles, Terrell, and Dutton (1990) analyzed data from the 1990 UPIN File and found that, on average, physicians served the Medicare population in 1.9 different practice settings, with a range of 1 to 45 settings. Practice settings were defined as a physical location, an organization of practice, or Medicare pricing locality. Because they can bill under more than one Medicare provider number, physicians practicing in multiple settings may produce an artificially high number of "split" practices with low Medicare reimbursements. Furthermore, as noted earlier, group practices may also be split if individual members bill under different provider numbers. Finally, the BMAD data do not contain beneficiaries' payments to the practices.

4.3.2 Provider Delivery Patterns

4.3.2.1 Research Questions

In this section, several issues are explored that relate to the delivery of services in medical practices. Much of this information could be useful

for exploring the feasibility of VI measures based on services within the practice. The following research questions are addressed:

- o How many different Medicare patients are seen by different medical practices during a year? How do the numbers vary among solo and group providers?
- o What is the composition of services by place and type of service? How does this vary among solo and group providers, and with aggregate Medicare practice revenue?
- o How do aggregate Medicare revenues, beneficiaries seen, and reimbursements per beneficiary seen vary over time for providers?
- o How stable over time are Medicare revenues per beneficiary seen? To what degree does the temporal stability improve when patients with low or high reimbursements are excluded?

If the VI measure is unreliable, providers may be unfairly rewarded or penalized for volume or revenue changes that have little to do with their success in controlling VI. To reduce the chances that measurement of group performance is unduly influenced by stochastic elements of medical care demand by the beneficiaries they serve, voluntary groups might have to be restricted to groups serving minimum numbers of patients seen, or to minimum levels of annual Medicare revenues. With more than one year of data for the same practices, it is possible to investigate the relative stability over time of reimbursements per beneficiary seen, and to assess whether restrictions such as these might be needed.

4.3.2.2 Methodology

Detailed information about Medicare provider delivery patterns, such as numbers of different Medicare patients seen annually, can only be obtained from analysis of individual claims data. It was not feasible to analyze

claims level data for all practices with claims in the 5-percent BMAD files, and a sample of practices was selected.

Because there were relatively few multi-specialty group practices in the BMAD data, all were selected for this subsample with certainty. Simple random samples yielding roughly 1,000 provider numbers each were chosen for solo and single-specialty provider types. As a result, all claims for a subsample of 2,671 practices were retrieved from the 1988 BMAD file. This nonrandom sample of providers was used to analyze patterns within, and differences among, provider types. Details about the analytic file construction are included in the Technical Appendix.

The measure being explored here for the practice management model, namely, reimbursements per unique patient seen, requires a definition for what constitutes being seen by a provider. Seeing a patient was defined technically in this study as a provider receiving Medicare reimbursements after the beneficiary's Medicare deductible was met during a calendar year.⁶ This is consistent with the MVPS, which does not include beneficiaries' out-of-pocket payments.

If VI targets are based on historical VI rates for a volunteering organization, important research questions pertain to the temporal stability of the VI rates. One aspect of temporal stability is that each practice's VI rate remains constant relative to other practices.

Temporal stability was operationally measured in this study through a "mean absolute percentage error" (MAPE) analogous to those commonly used in

⁶ There were significant numbers of claims in the BMAD Provider file where no Medicare reimbursements were actually made to a provider. Aside from denials of claims by carriers, this will occur when a beneficiary has not met the deductible.

empirical studies of forecasting accuracy. The MAPE indicators were constructed to test the accuracy of a practice's forecasted versus actual reimbursements per beneficiary seen, and were derived under the assumption of relative constancy with respect to a pooled national average of Medicare reimbursements per patient seen. Similar MAPE measures were used to measure the temporal stability of fee-for-service Medicare reimbursements per capita in counties against alternative geographic units for basing Medicare capitation payments to HMOs (Porell, Tompkins, and Turner, 1990).

The MAPE measure of stability was defined technically in the following manner. Let PR_{87} be defined as the level of Medicare reimbursements per patient seen by a practice in 1987. Define N_{87} as an aggregate national measure of Medicare reimbursements per patient seen.⁷ Over time the national measure N_{87} would be expected to rise as physician fees increase and if average service intensity increases. Since N_{87} is measured from data pooled over a large number of practices, changes in this aggregate measure over time should reflect broad industry-wide factors. A practice's Medicare reimbursement per patient seen in 1987 relative to this national amount in the same year would be defined as the ratio of PR_{87} to N_{87} .

The relative ratio (PR_{87}/N_{87}) will be less than unity for some practices and greater than unity for others in a given year. The size of this ratio will be influenced by a number of factors, including a provider's allowed charge levels and mix of services relative to other providers nationally. What matters for stability in the VI measure is not the size of this ratio in any year, but rather the degree to which this ratio remains relatively

⁷ Note that beneficiaries having positive reimbursements for more than one physician provider would be counted more than once in a national count of patients seen.

constant over time for individual practices. For example, the Medicare reimbursements per patient seen for a practice might be twice the national average in one year. Assuming the Medicare practice is relatively stable in terms of patient case-mix and service intensity, its nominal level would be expected to remain about twice the national average the next year.

Whether Medicare practices are fairly stable over time can be tested by comparing a "predicted" level of provider Medicare reimbursements per patient seen under the hypothesis that the ratio (PR_{87}/N_{87}) is constant with actual reimbursement rates. Predicted provider reimbursements per patient seen in 1988, or PPR_{88} are generated by multiplying a provider's 1987 relative ratio by the actual level of pooled national reimbursements per patient seen, or N_{88} , as follows:

$$PPR_{88} = N_{88} * (PR_{87}/N_{87}). \quad [4.1]$$

The more stable are Medicare practices, the lesser will be the prediction error from equation [4.1].⁸ The mean of the absolute percentage difference between actual reimbursement rates (PR_{88}), and predicted rates (PPR_{88}) (i.e., the MAPE) offers a straightforward indicator of the average size of prediction errors among practices.

Instability in Medicare reimbursements per patient seen can potentially result from serving differing numbers of patients over time with extremely high or low levels of Medicare reimbursements. For example, if the fraction

⁸ Note that an alternative equivalent expression for [4.1] is: $PPR_{88} = PR_{87} * (N_{88}/N_{87})$. In other words, the annual growth rate in reimbursements per patient seen for a stable practice would not differ much from the pooled national average growth rate.

of patients hospitalized changes from one year to the next the provider's VI rate could also change. The effects of stochastic variations might be of particular concern for providers with a relatively small Medicare patient base.

To test for the effects of high cost outlier patients, several alternative MAPEs were calculated in which individual beneficiaries' reimbursements exceeding certain thresholds were removed. Patients' reimbursements in excess of the outlier threshold were truncated at the respective outlier threshold levels for these MAPE calculations. A set of six alternative thresholds were defined for each practice on the basis of its distribution of Medicare reimbursements per patient in 1988. For example, under an outlier threshold of three standard deviations, a patient's reimbursements exceeding the simple provider mean reimbursement per patient plus 3 standard deviations for any patient would not be counted toward provider mean in MAPE calculations. Also tested were thresholds based on 2.5, 2, 1.5, 1, and 0.5 times the individual practice's standard deviation for mean reimbursements per patient seen. To the extent that high cost outlier patients are an important factor affecting the stability of mean reimbursement rates, stability is likely to be enhanced as the outlier threshold levels are lowered.

In the case of mean reimbursements per patient seen there is a second potential source of instability that is of research interest, namely, variations in patients with very low reimbursement rates over time. Under the definition of "patient seen" discussed earlier, a beneficiary is fully counted as a patient seen in a provider's patient base with any Medicare reimbursement, whether or not any services were received from any other

provider during the year. A beneficiary needs only to have incurred medical expenses exceeding the Medicare deductible of \$75 to be counted as a patient by some provider.⁹ A single extra visit by each of many patients in a given year, for example because of a flu outbreak, could result in substantial year-to-year changes in Medicare patients seen, and significant changes in reimbursements per patients seen.

To test for the potential effects of changes in low cost patients seen, an additional set of MAPEs was calculated for providers after imposing a minimum annual Medicare reimbursement threshold of \$50 to a provider before a beneficiary is counted in a provider's patient base. Imposition of a minimum threshold of this sort should tend to stabilize rates of reimbursements per patient seen simply because the number of low reimbursement patients is probably susceptible to large year-to-year variations.

MAPE measures of predictive accuracy were generated for each practice in the original sample drawn from the 1988 BMAD Provider file that were found to have positive reimbursements in the 1987 BMAD file. Of the original 2,671 sample providers with positive 1988 reimbursements 1,714 providers also had positive reimbursements in 1987.

4.3.2.3 Empirical Findings

Delivery patterns by provider type

For a sample of 2,671 providers drawn from the entire 1988 BMAD file, the top portion of Table 4.4 contrasts mean numbers of beneficiaries seen, mean aggregate Medicare reimbursements and mean reimbursements per patient

⁹As of January 1, 1991 the Part B deductible increased to \$100.

Table 4.4

PART B PHYSICIAN REIMBURSEMENTS BY PROVIDER TYPE (1988)¹

	Solo(n=933)		Single-specialty Group(n=931)		Multi-specialty Group (n=807)	
	<u>mean</u>	<u>sd</u>	<u>mean</u>	<u>sd</u>	<u>mean</u>	<u>sd</u>
Number of Patients	144.0	268.1	198.8	687.6	604.9	1,457.1
Total Medicare Reimbursements Per Provider	37,546	99,157	60,007	241,187	124,350	574,859
Reimbursements Per Patient	276.3	437.4	500.3	802.5	246.6	443.0

DISTRIBUTION OF AGGREGATE PART B PHYSICIAN REIMBURSEMENTS
BY PLACE OF SERVICE AND TYPE OF SERVICE

Office visit	23.9 %	10.0 %	12.8 %
Office surgery	8.0	2.1	2.5
Office consult.	1.1	.5	.9
Office x-ray	10.1	15.5	11.2
Office-other	1.6	.4	2.0
Total Office	44.7	28.5	29.4
Hosp. visit	15.1	12.7	10.4
Hosp. surgery	8.2	8.9	8.6
Hosp. consult.	5.3	4.3	2.0
Hosp. x-ray	5.5	17.2	13.9
Hosp.-other	3.1	3.3	5.8
Total Hospital	37.2	46.4	40.7
Outpt. visit	1.3	6.6	12.6
Outpt. surgery	7.8	4.7	3.8
Outpt. consult.	.1	.2	.2
Outpt. x-ray	3.3	10.6	8.4
Outpt.-other	1.4	1.0	1.8
Total Output	13.9	23.1	26.8
Other visit	2.7	.6	2.8
Other surgery	.6	.0	.0
Other consult.	.1	.0	.0
Other x-ray	.0	.2	.2
Other-other	.5	1.3	.2
Total Other	3.9	2.1	3.2
Total	100.0 %	100.0 %	100.0 %

¹ Unweighted

Source: 1988 BMAD 5% Provider file

seen by provider type in 1988. These statistics are unweighted.¹⁰ In the lower portion of Table 4.4 the mean percentage of aggregate reimbursements derived from different places of service and different types of service are presented.

The mean number of Medicare patients seen annually was just 144 for solo providers. The means for single-specialty group and multi-specialty group providers were significantly higher: 199 and 605 patients, respectively. Although there were no reliable data regarding the numbers of physicians in a practice, differences in the mean number of beneficiaries by provider type may be at least partly attributable to greater numbers of practitioners in group practices.

Mean aggregate Medicare reimbursements follow a similar pattern. Mean reimbursements were lower for solo providers (\$37,546) than for single-specialty groups (\$60,007) and multi-specialty groups (\$124,350). Single-specialty groups received the highest reimbursement rate per patient seen in 1988 (\$500); solo and multi-specialty group providers received much lower rates (\$276 and \$246 per patient seen, respectively).¹¹

In the lower portion of Table 4.4, the mean percentage of payments derived from different places and types of services are presented by provider type. Among solo providers, the mean Medicare reimbursements derived from office visits in 1988 was 44.7 percent. Among other provider types, the

¹⁰ Due to the skewed size distribution of the sample population, weighting observations by the size of a provider's patient base produced unusually large means that did not accurately portray the Medicare physician provider population.

¹¹ Within each provider type, the product of the mean number of patients seen and mean reimbursements per patient seen need not be, and in fact is not, equal to mean reimbursements per provider. This is because the number of patients seen and mean reimbursements per patient seen are correlated at the provider level.

percentage was much lower. Within the office setting, solo and multi-specialty group providers derived the highest percentage of reimbursement from visits, while single specialty groups derived most of their reimbursements from x-rays and laboratory tests. This could reflect the fact that global fees are in place for many surgical procedures, but not for medical services. Often surgeons do not bill separately for visits, which are implicit in the global fees.

Single-specialty group providers received the highest mean proportion of Medicare revenues from services rendered to patients in the hospital, which may partly explain their higher reimbursement rates. On average, single-specialty groups generated 46.4 percent of their Medicare reimbursements in the hospital as compared to 37.2 percent and 40.7 percent for solo and multi-specialty providers, respectively. Since single-specialty groups are often hospital based, these findings are quite reasonable. In the outpatient setting, single and multi-specialty group providers generated an average of 23.1 percent and 26.8 percent of Medicare reimbursements in 1988, respectively. The average for solo providers was much lower, just 13.9 percent. Offices visits may be a substitute for hospital outpatient department services.

With respect to type of service, solo providers generated a greater proportion of their revenues from visits than group practice providers: 43 percent versus 29.9 percent for single-specialty groups and 38.6 percent for multi-specialty groups. Conversely, group practices of both types earned a higher percentage of their Medicare revenues from x-ray and laboratory services.

Provider differences by level of aggregate Medicare reimbursements

Table 4.5 is similar to Table 4.4 except that practices are grouped on the basis of their levels of aggregate total Medicare reimbursements. Table 4.5 shows all providers assigned to quartiles, the boundary points of which were based on the distribution of providers ranked according to aggregate Medicare reimbursements in the 1988 BMAD Provider Summary file (with over 37,000 observations). Because the subsample of 2,671 providers included disproportionate numbers of group practices, which tend to be larger, the distribution of those providers across the quartiles was shifted upward.

Providers in the uppermost quartile earned mean reimbursements of \$225,788. This was approximately twenty times higher than those of providers in the next highest quartile with mean reimbursements of \$11,126. Mean provider reimbursements in the two lowest quartiles were \$1,565 and \$143, respectively.

With respect to the number of beneficiaries seen by providers with different levels of aggregate reimbursements, as expected, aggregate reimbursements appear to be strongly correlated with the volume of patients seen. However, the differences in number of beneficiaries served between quartiles are not nearly as great as the differences in payments. Consequently, differences among providers' reimbursements per patient seen are less pronounced. The highest mean reimbursement per patient of \$507 went to providers in the third quartile. These data do not show the extent to which some providers may be accounting for a higher proportion of their patients' total Medicare services.

The bottom portion of Table 4.5 shows the distribution of reimbursements by place and type of service by quartiles. With respect to place and type of

Table 4.5

PART B PHYSICIAN REIMBURSEMENTS BY QUARTILE (1988)¹
(n=2671)

	Quartile 4(n=809)		Quartile 3(n=674)		Quartile 2(n=644)		Quartile 1(n=544)	
	mean	sd	mean	sd	mean	sd	mean	sd
Number of Patients	908.0	1,527.6	92.5	124.9	14.5	21.7	2.5	2.6
Total Medicare Reimbursements Per Provider	\$225,788	614,802	11,126	6,080	1,565	910	143	114
Reimbursements Per Patient	\$ 401.9	565.4	507.0	880.5	330.0	445.9	79.4	77.6

**DISTRIBUTION OF AGGREGATE PART B PHYSICIAN REIMBURSEMENTS
BY PLACE OF SERVICE AND TYPE OF SERVICE**

Office visit	12.2 %	30.4 %	39.1 %	43.3 %
Office surgery	3.2	4.7	3.7	3.4
Office consult.	.9	.6	1.0	2.1
Office x-ray	12.3	8.5	11.4	16.7
Office-other	1.5	1.3	2.9	1.3
Total Office	30.1	45.5	58.1	66.8
Hosp. visit	11.7	12.2	7.0	3.7
Hosp. surgery	9.0	4.6	4.0	1.5
Hosp. consult.	3.1	2.3	1.6	2.7
Hosp. x-ray	13.7	8.7	8.1	3.2
Hosp.-other	5.2	1.0	.8	1.4
Total Hospital	42.7	28.8	21.5	12.5
Outpt. visit	8.9	13.9	8.2	9.2
Outpt. surgery	4.9	2.3	1.7	.7
Outpt. consult.	.2	.1	.5	.0
Outpt. x-ray	8.4	5.3	4.9	4.6
Outpt.-other	1.6	1.0	.4	.4
Total Outpt.	24.0	22.6	15.7	14.9
Other visit	2.3	2.1	2.5	3.0
Other surgery	.1	.2	.3	.2
Other consult.	.0	.1	.0	.1
Other x-ray	.2	.1	.6	.7
Other-other	.5	.5	1.2	1.7
Total Other	3.1	3.0	4.6	5.7
Total	100.0 %	100.0 %	100.0 %	100.0 %

¹ Unweighted

Source: 1988 BMAD 5% Provider file

service, providers in the highest quartile received a higher proportion of their 1988 Medicare reimbursements from hospital services than providers in the remaining three quartiles. They also received higher fractions of their reimbursements for surgery, x-ray and laboratory services than providers with lower mean reimbursements per patient. Providers with the lower mean reimbursements per patient tend to earn the highest proportion of their reimbursements from office-based services and lesser from inpatient hospital services. However, it should be remembered that this sample of practices overrepresents groups, especially multi-specialties.

Table 4.6 is also similar to Table 4.4, but it contains only providers in the highest decile when ranked by aggregate Medicare reimbursements. The sample providers in this group all had aggregate Medicare reimbursements exceeding \$100,000 in 1988. Aside from obvious scale differences in levels of aggregate reimbursements and patients served, one of the more striking differences is the dramatic increase in the mean reimbursements per patient seen for solo practitioners. The mean reimbursement per patient for the solo providers in the highest decile of \$521 per patient was nearly double the mean of \$276 per patient for all solo providers as shown in Table 4.4.

A bimodal distribution of solo providers is suggested, where the higher rate of reimbursements for solo providers in the uppermost percentiles reflects the isolation of specialist solo providers from general practice solo providers. Comparison of the composition of reimbursements by place and type of service for highest decile solos with those reported earlier on Table 4.4 for all solo physicians strongly suggests that the higher reimbursement rate is primarily due to a greater fraction of their reimbursements being associated with inpatient hospital surgery.

Table 4.6

**PART B PHYSICIAN REIMBURSEMENTS BY PROVIDER TYPE (1988)
FOR PROVIDERS WITH MEDICARE REIMBURSEMENTS OF \$100,000 OR MORE¹
(n=369)**

	Solo(n=93)		Single-specialty Group(n=99)		Multi-specialty Group (n=177)	
	<u>mean</u>	<u>sd</u>	<u>mean</u>	<u>sd</u>	<u>mean</u>	<u>sd</u>
Number of Patients	619.7	512.6	1,346.2	1,627.0	2,130.7	2,515.2
Total Medicare Reimbursements Per Provider	245,470	215,745	474,151	595,563	500,844	1,152,585
Reimbursements Per Patient	520.9	432.8	532.1	487.8	295.4	315.0

**DISTRIBUTION OF PART B PHYSICIAN REIMBURSEMENTS
BY PLACE OF SERVICE AND TYPE OF SERVICE**

Office visit	17.2 %	12.8 %	13.7 %
Office surgery	7.4	2.7	2.6
Office consult.	.8	.7	1.3
Office x-ray	9.1	11.0	15.5
Office-other	8.3	.6	2.1
Total Office	37.1	27.8	35.2
Hosp. visit	16.5	19.2	13.4
Hosp. surgery	18.0	16.0	8.7
Hosp. consult.	7.5	8.4	3.1
Hosp. x-ray	.9	10.1	8.6
Hosp.-other	2.3	3.1	5.2
Total Hospital	45.2	56.8	39.0
Outpt. visit	.4	1.5	9.1
Outpt. surgery	11.6	5.2	3.4
Outpt. consult.	.1	.1	.2
Outpt. x-ray	.6	5.0	5.4
Outpt.-other	1.9	1.7	1.9
Total Outpt.	14.6	13.5	20.0
Other visit	2.1	.7	5.4
Other surgery	.1	.0	.0
Other consult.	.2	.0	.1
Other x-ray	.1	.0	.1
Other-other	.8	1.3	.2
Total Other	3.3	2.0	5.8
Total	100.0 %	100.0 %	100.0 %

¹ Unweighted

Note: This table reflects only providers in the highest decile when ranked by aggregate Medicare reimbursements (approximately \$100,000 or more)

Source: 1988 BMAD Provider file

Single specialty groups in the highest decile are also shown to generate greater proportions of their revenues from inpatient hospital services than single specialty groups in general. In contrast to solo providers, this increase was associated with a roughly equivalent decrease in the proportion of reimbursements generated in outpatient hospital settings. Finally, it is interesting to note that the proportion of Medicare reimbursements generated through office-based services is actually higher for multi-specialty groups in the highest decile of reimbursements (35%) than for all multi-specialty groups (29%). Possibly, the largest multi-specialty groups provide a wider range of primary care services than smaller multi-specialty groups.

Changes in patients and reimbursements between 1987 and 1988

Table 4.7 shows changes in reimbursements and patients for 1,714 sample providers having positive Medicare reimbursements in both 1987 and 1988. The first four columns of Table 4.7 show the values for the providers found at the boundary points of the quartiles in the sample of 1,714 practices, when ranked according to the measure shown in the relevant row. For example, when the 1,714 practices were ranked in terms of the number of patients seen, the boundary provider between the first and second quartiles saw 6, the median provider saw 33.5, the boundary provider between the third and fourth quartiles saw 248, and the maximum value in the sample was 13,637.

The last column in Table 4.7 shows the mean values for all providers in the sample. The mean number of patients seen in 1988 (about 341) was more than ten times the median number (33.5); similarly mean total reimbursements (\$85,772) was more than eleven times the total reimbursements for the median

Table 4.7

UNIVARIATE STATISTICS FOR SELECTED VARIABLES FOR PROVIDERS
WITH REIMBURSEMENTS IN 1987 AND 1988
(n=1,714)

	<u>Quartile 2</u>	<u>Median</u>	<u>Quartile 4</u>	<u>Maximum</u>	<u>Mean</u>
Patients, 1988	6	33.5	248	13,637	340.8
Total Reimbursements, 1988	\$ 1,157	\$ 7,499	\$ 47,340	\$ 11,005,731	\$ 85,772
Reimbursements Per Patient, 1988	\$ 78.7	\$ 178.6	\$ 405.2	\$ 6,929.9	\$ 347.7
Percent Change in Patients, 1987-1988	-18.1 %	2.2 %	31.2 %	22,900 %	109.6 %
Percent Change in Reimbursements, 1987-1988	-32.9 %	3.7 %	55.8 %	73,819.7 %	296.6 %
Percent Change in Reimbursements Per Patient, 1987-1988	-24.2 %	.1 %	31.3 %	7,375.8 %	51.3 %

Source: 1987 and 1988 BMAD Provider files

provider (\$7,499). Providers in the highest quartile had total reimbursements between \$47,340 and \$11,005,731. The mean reimbursements per patient in 1988 (almost \$348) was nearly twice as large as the median (about \$177). The largest fourth of providers ranged from \$405 to \$6,930 per patient seen.

The statistics pertaining to percentage changes in patients and reimbursements suggest a fairly wide dispersion in the changes experienced by Medicare providers between 1987 and 1988. The median increase in beneficiaries served was only 2.2 percent. Half of the providers experienced either a decrease in different patients seen of more than 18 percent (the lowest quartile), or an increase in different patients served of more than 31 percent (the highest quartile). The mean for all providers in the sample was 109.6 percent.¹²

Aggregate Medicare reimbursements increased by 3.7 percent for the median provider. Again there was a fairly wide dispersion among providers, however. Half of the providers experienced either a decrease in aggregate Medicare revenues of more than 33 percent, or an increase of more than 55 percent. The provider with the largest percent change in reimbursements (73,820%) may have had nearly zero reimbursements in 1987. (Of course, data errors cannot be ruled out, especially when such extreme cases are isolated.) Finally, while the percentage change in Medicare reimbursements per patient seen was virtually unchanged for the median provider at 0.1 percent, half of the providers experienced either a decrease of more than 24 percent, or an

¹² It should be remembered here that these figures pertain to different beneficiaries served, and not counts of visits. Different numbers of unique patients seen can correspond to the same number of visits provided since no account is made of visits per patient.

increase exceeding 31 percent. The mean change in reimbursements per patient seen was 51.3 percent.

MAPE measures of stability

Table 4.8 shows the MAPEs by reimbursement quartile and provider type. MAPEs represent the mean absolute percentage difference between the actual and projected 1988 reimbursements per patient seen based on a national average growth rate. The MAPEs were computed with provider observations weighted by the relative size of their Medicare patient base in 1988. Given the skewed distribution of providers by reimbursements and patients seen, unweighted statistics would place too much emphasis on the temporal stability of the large number of providers with few Medicare patients.

The statistics in Table 4.8 reveal that the mean MAPE is lowest for providers with large total reimbursements, that is, providers who fell in the top quartile of the distribution of aggregate Medicare reimbursements in 1987. The mean MAPEs tend to increase in the lower quartiles 2, 3 and 4, suggesting that MAPEs vary inversely with Medicare practice size. Among provider types, mean MAPES were lowest for single-specialty groups and multi-specialty groups, in large part because group practices had the greatest Medicare reimbursements and patient bases. Within quartiles, there is no consistent relationship between mean MAPES and provider types, suggesting that observed provider type differences are due more to scale than to differences in the medical practice styles of the provider types.

Overall, the MAPEs presented in Table 4.8 do not portray mean reimbursements per patient seen as exhibiting strong temporal stability. As discussed earlier, two potential methods for enhancing the stability of the

Table 4.8

**MEAN ABSOLUTE PERCENTAGE ERRORS (MAPES)* FOR ALL PROVIDERS
WITH ANY REIMBURSEMENTS IN 1987 AND 1988**

		<u>n</u>	<u>MAPE mean</u>
<u>All providers</u>		1,714	16.7
<u>Reimbursement Quartile</u>	1st Quartile	558	14.4
	2nd Quartile	462	27.0
	3rd Quartile	455	59.9
	4th Quartile	239	85.8
<u>Provider Type</u>	Solo	650	22.7
	Single-specialty group	556	15.5
	Multi-specialty group	508	15.4
<u>Quartile 1 by Provider Type</u>	Solo	193	17.3
	Single-specialty group	144	12.2
	Multi-specialty group	221	14.3
<u>Quartile 2 by Provider Type</u>	Solo	188	26.3
	Single-specialty group	144	35.4
	Multi-specialty group	130	24.5
<u>Quartile 3 by Provider Type</u>	Solo	186	66.3
	Single-specialty group	167	76.0
	Multi-specialty group	102	37.4
<u>Quartile 4 by Provider Type</u>	Solo	83	79.5
	Single-specialty group	101	81.9
	Multi-specialty group	55	100.9

* MAPES represent the mean absolute percentage difference between the actual and projected 1988 reimbursements per patient seen based on a national average growth rate.

Source: 1987 and 1988 BMAD Provider file

performance measure were tested. Table 4.9 shows the effects of truncating the reimbursements of high cost outlier patients, and the removal of low cost patients with less than \$50 of Medicare reimbursements.

The right-hand column of the top portion of Table 4.9 shows that truncating the Medicare reimbursements of high cost patients does have an appreciable effect upon the coefficient of variation of reimbursements in 1988 among individual patients. Calculations of the coefficient of variation are based on the 2,316 providers with positive reimbursements in 1988. The mean coefficient of variation declines from 1.36 without truncation to 0.76 with truncation at the provider mean plus 0.5 times the standard deviation of that mean. In other words by truncating the reimbursements of high cost patients, the overall variation in reimbursements among individual patients has been substantially reduced.

Interestingly, the left-hand column shows that even with lesser dispersion in reimbursements among patients, the MAPE does not change appreciably if high cost outlier reimbursements are excluded. For all providers, all of the recalculated mean MAPEs associated with different truncation thresholds still ranged from 16.6 to 16.8 percent.¹³ Similar results were found when mean MAPEs were calculated by provider type and/or reimbursement quartile. These findings were unexpected since it is commonly held that individual high cost outlier thresholds should enhance stability by reducing the effects of stochastic variation in the medical expenses among individuals.

¹³There were 1,714 providers with positive reimbursements in 1987 and 1988. The sample was reduced to 1,568 providers because the MAPE could not be recalculated for some providers.

Table 4.9

MEAN ABSOLUTE PERCENTAGE ERRORS (MAPES)¹ WITH OUTLIER THRESHOLDSHigh Cost Outlier MAPES

<u>Individual outlier threshold</u>	MAPE	1988 coefficient of variation ²
	mean (n=1,714) ³	mean (n=2,316)
No threshold	16.8 %	1.36
Mean + 3.0 std. deviation	16.8	1.15
Mean + 2.5 std. deviation	16.8	1.10
Mean + 2.0 std. deviation	16.8	1.05
Mean + 1.5 std. deviation	16.8	.97
Mean + 1.0 std. deviation	16.7	.88
Mean + 0.5 std. deviation	16.6	.76

MAPE by Provider Type with \$50 Minimum Reimbursement Threshold

	n	MAPE mean
All providers	1,582	12.8
Solo	608	17.6
Single-specialty group	508	14.5
Multispecialty group	466	10.6

¹ MAPES represent the mean absolute percentage difference between actual and projected 1988 reimbursements per patient seen based on a national average growth rate.

² Coefficient of variation = (standard deviation/mean)

³ The sample size fell to 1,568 when standard deviations were calculated.

⁴ The sample sizes fell because some providers only had patients with \$50 or less in reimbursements.

Source: 1987 and 1988 BMAD Provider file

The bottom portion of Table 4.9 shows the effect of excluding patients with provider reimbursements of less than \$50 from computation of mean reimbursements per patient seen. Of the 1,714 providers in the sample, 132 saw patients only with \$50 or less in reimbursements, resulting in a sample of 1,582 providers. The MAPE values are reported for all sample providers, and by provider type. While the empirical results still show relatively high MAPE values, they also indicate fairly substantial reductions in mean MAPE values by exclusion of patients with low reimbursements. For all providers, the mean MAPE declined from 16.8 percent to 12.8 percent. The instability in the performance measure reimbursements per patient seen is apparently attributable more to year-to-year variations in numbers of patients seen with low reimbursements than to variations in patients with high cost catastrophic expenses.

Even with the exclusion of low reimbursement patients in counts of patients seen, the MAPE values estimated from our sample data only reached levels slightly under 10 percent for providers in the highest reimbursement quartile. However, our analysis did indicate that MAPEs tended to be inversely related to practice size as measured in the number of patients seen, or in dollars of Medicare reimbursements. Accordingly, we sought to estimate a critical minimum value where MAPE values would be indicative of stability in mean reimbursements per patient seen as reflected in an average MAPE of less than 5 percent. The small number of providers for which counts of Medicare patients were derived permitted only a ballpark estimate. Moreover, time and budget resources precluded drawing a larger provider sample from the BMAD file.

MAPE estimates were regressed on the square root of the number of beneficiary patients seen by a provider for the entire sample of providers with 1987 and 1988 data. Since the number of patients seen varied for some providers between 1987 and 1988, patients seen was specified in the regressions as the average of the two-year counts.¹⁴ The square root of patients seen was specified because standard errors vary with the square root of population size. The linear regression produced the following results:

$$\begin{array}{rcll} \text{MAPE} = & 147.85 & - & 3.89 \text{ Sqrt(patients)} , & R^2 = 0.014 , \\ & (10.3) & & (-4.9) \end{array}$$

where, t-statistics for the estimated coefficients are presented in parentheses.

Setting MAPE equal to 5.0, the critical threshold number of Medicare patients associated with an average MAPE of 5 percent was calculated from the estimated equation to be 1,340. However, the very small percentage of variance explained (less than 2 percent) indicates that practices will differ considerably in their actual MAPEs even if the mean MAPE is 5 percent.

4.3.3 Beneficiary Utilization Patterns

4.3.3.1 Research Questions

Empirical information about Medicare beneficiary utilization patterns would help to assess possible VI measures reflecting patient management, i.e., that include services provided outside of the volunteering organization. Beyond services within the practice, management of care may require that

¹⁴Alternatives were to specify either the actual 1987 or 1988 counts. There are drawbacks to any of these specifications, but the results were not qualitatively sensitive to the alternative measures.

providers have influence with their patients sufficient to help avert unnecessary self-referrals to other providers.

Certainly, the degree to which various providers could manage the care of their Medicare beneficiaries cannot be readily quantified with these data. Nevertheless, it is feasible to observe the tendencies of beneficiaries to use one versus multiple practices during a year, and the degree to which providers serve the same versus new patients from year to year. This may help to assess to what degree existing patterns of care in fee-for-service practices might approximate those of a closed enrollment system.

The following research questions pertaining to beneficiary utilization patterns are addressed:

- o How many different practices do Medicare beneficiaries tend to use in a year? Are there systematic differences between the characteristics of beneficiaries who use few versus many different practices?
- o What proportion of beneficiaries' total physician reimbursements are accounted for by different types of practices? Do group practices account for greater shares than solo providers?
- o What proportion of reimbursements typically go to the practice with the largest share? Are certain types of providers, such as multi-specialty groups, more likely than others to have the greatest share of annual reimbursements?
- o What proportion of reimbursements typically go to practices that provide the greatest number of office visits to a beneficiary in a year?
- o To what degree do providers serve the same Medicare beneficiaries from year to year? What proportion of providers' Medicare revenues are accounted for by returning versus new patients?
- o How frequently do beneficiary utilization patterns result in the same provider having maximum annual reimbursements and/or office visits every year?

Although most beneficiaries may tend to use their primary care physicians for routine care, some also need to use multiple providers. It is expected that patients using multi-specialty groups will exhibit a greater

propensity toward exclusive utilization of the services provided by the group practice.

4.3.3.2 Methodology

A desirable analytical approach to testing whether Medicare beneficiaries are more likely to exclusively utilize the services of certain types of providers would be to measure the within-provider versus other-provider utilization for at least a sample of beneficiaries served by the same physician practice. Such an approach could be taken if all beneficiary claims were available for at least samples of patients using the practices contained in the BMAD Provider file. However, time and resources did not permit the analysis of beneficiary utilization patterns for specific practices. Instead, analysis was undertaken of provider utilization patterns for a sample of beneficiaries drawn from the 1988 BMAD Beneficiary file.

A sample of 150,184 aged beneficiaries was drawn from the 1988 BMAD Beneficiary file. The sampling framework differed from random sampling by the exclusion of beneficiaries who had only seen providers with ambiguous provider types (about 7 percent of the physician practices). Thus, the sample included beneficiaries with claims for at least one single- or multi-specialty group practice over the year, or only had claims for solo practice physicians during the year. ID numbers for beneficiaries in the sample were used to retrieve claims from the 1987 BMAD Beneficiary file.¹⁵

¹⁵ The 1987-1988 sample is not representative of the aged population since it excludes beneficiaries who died in 1987 and hence were not included in the original 1988 sample. The more recent year 1988 was chosen for sample selection rather than 1987 because it was not clear that time would permit multi-year analyses of data under the study work plan.

Demographic information and provider use patterns for the calendar years 1987 and 1988 were obtained, including:

- o Total physician reimbursements
- o The number of different practices with claims
- o Reimbursement amounts for practices with the largest reimbursements
- o Whether there were any inpatient hospital claims

In addition, more detailed summary information -- including provider specialty, provider type, and the service composition of reimbursements by place and type of service -- was obtained for up to three different practices with claims during the year. The practice with the earliest service date during the calendar year was designated as the "first seen" provider. The practice with the most reimbursements over the year was designated as the "maximum reimbursement" provider. Finally, the practice with greatest number of office visits during the year was designated as the "maximum office-visit" provider. Note that as few as one or as many as three different practices may be assigned to this classification of practices.

The maximum reimbursement provider would be the practice with the least other-provider use under a non-enrollment patient management model. It is of interest to know how these practices might differ from other practices, as well as what beneficiary characteristics are associated with maximum reimbursement providers with higher versus lower reimbursement shares. Maximum office-visit providers were designated to analyze which providers beneficiaries tend to see most frequently outside of institutional settings.

The first seen physician was chosen as an operational way of randomly choosing a practice for each beneficiary. This randomly selected practice serves as a bench mark for comparison with the maximum reimbursement and

office-visit providers. The first seen provider allows testing of whether multi-specialty group practices tend to account for greater shares of total annual beneficiary physician reimbursements than single-specialty groups or solo physicians. Since first seen practices are randomly selected, it is legitimate to pool observations by solo practitioner, single-specialty group, and multi-specialty group to analyze within-provider shares of total reimbursements. It would not be appropriate to draw conclusions based on maximum reimbursement or office-visit providers alone because providers are likely to serve patients with both large and small within-provider reimbursement shares.

4.3.3.3 Empirical Findings

Use of different providers

Table 4.10 shows the distribution of beneficiaries receiving services from one or more practices in 1988 (N = 116,382).¹⁶ Relatively few of these beneficiaries (20.3%) who met their deductible used only one practice over a year. Nearly as many beneficiaries (19.7%) used seven or more practices in a year, and over half (51.3%) used three or more different practices. These data strongly suggest that in the fee-for-service sector, beneficiaries currently are unlikely to restrict their use of physician services to a single practice.

Table 4.11 shows the mean 1988 Medicare reimbursements for beneficiaries seeing differing numbers of practices over a year. The pattern of mean

¹⁶There were 150,184 beneficiaries in our sample. Of these, 22,578 were excluded because they had zero reimbursements, and 11,224 were excluded because the available data indicated they may have been under 65 years of age.

Table 4.10

FREQUENCY DISTRIBUTION OF BENEFICIARIES WITH PART B REIMBURSEMENT
 BY NUMBER OF PROVIDERS SEEN IN A YEAR (1988)
 (n=116,138)

<u>Number of Providers Seen</u>	<u>Percent of Beneficiaries</u>	<u>Cumulative Percent</u>
1	20.3 %	20.3 %
2	16.4	36.7
3	13.0	49.7
4	10.7	60.4
5	8.4	68.8
6	6.9	75.7
7	5.6	81.3
8	4.2	85.5
9	3.3	88.8
10	2.7	91.5
11	2.0	93.5
12	1.5	95.0
13	1.2	96.2
14	0.9	97.1
15	0.7	97.8
16	0.5	98.3
17	0.4	98.7
18	0.3	99.0
19	0.3	99.3
20+	0.7	100.0

Source: 1988 BMAD 5% Beneficiary file

Table 4.11

MEAN PART B REIMBURSEMENTS TO DISTINCT PROVIDERS
BY NUMBER OF PROVIDERS SEEN (1988)

Mean Reimbursements to Each Provider,
Ranked by Size of Reimbursements Per Provider

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5+</u>	<u>Total</u>	<u>n</u>
<u>Number of Providers Seen</u>							
Only one	\$ 93.4					\$ 93.4	23,620
Two	179.5	\$ 41.9				221.3	18,993
Three	279.8	79.4	\$ 30.6			389.8	15,154
Four	395.6	120.0	56.0	\$ 25.4		597.0	12,402
Five or more	927.4	372.8	215.8	141.2	\$ 304.1	1,961.4	45,969

Source: 1988 BMAD Beneficiary file

reimbursements strongly suggests that the health status of beneficiaries who receive physician services from few providers differs from that of beneficiaries receiving physicians from multiple providers. Mean reimbursements for beneficiaries seeing only one practice over the year was \$93. Mean reimbursement rates rise for beneficiaries using more than one practice. The mean per capita reimbursements for beneficiaries using five or more different practices was \$1,961 -- more than three times larger than the rate of \$597 for those using exactly four. Over 39 percent of beneficiaries with claims used five or more practices during the year. Combined with their high rate of reimbursements, these beneficiaries apparently account for a very large proportion of overall Medicare physician reimbursements, perhaps in excess of 83 percent.

Table 4.12 shows some characteristics of beneficiaries who used different numbers of practices in 1988. In general there were rather modest but statistically significant differences in the demographic composition of the beneficiary groupings. Greater numbers of providers used were associated with higher mean age, percent of beneficiaries older than 85 years of age, percent of white beneficiaries, and percent of beneficiaries on welfare.

Most important, however, was whether or not a beneficiary was hospitalized during the year. Only 2.6 percent of beneficiaries using a single practice in 1988 were hospitalized in the same year. The fraction of beneficiaries hospitalized increased with the number of different providers used. A particularly sharp increase in hospitalization rates was associated with using five or more alternative providers. Whereas only 13.3 percent of beneficiaries using three alternative providers were hospitalized in 1988, 56

Table 4.12

BENEFICIARY CHARACTERISTICS BY
NUMBER OF PROVIDERS SEEN (1988)

Beneficiary Attribute	Number of Providers Seen				
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5+</u>
Age, mean	74.1	74.6	75.1	75.3	76.0
Percent > 85 years old	9.4%	10.5	12.1	11.9	13.7
Sex					
Female	60.1%	62.6	64.3	64.2	61.8
Male	39.9	37.4	35.7	35.8	38.1
Race					
White	88.2%	89.3	90.3	90.1	90.5
Black	8.6	7.5	6.9	6.8	6.7
Other	2.3	2.2	1.9	2.1	1.7
Unknown	0.9	0.9	0.8	1.1	1.1
Percent on Welfare	8.4%	8.8	8.8	9.5	10.5
Percent Hospitalized	2.6%	6.7	13.3	22.6	56.1
Percent with Reimbursements					
< \$100	75.8%	53.2	35.5	9.5	32.8
\$100 - \$999	23.4	44.4	59.4	68.7	62.3
>= \$1000	.8	2.4	5.1	21.8	4.9

Source: 1988 BMAD Beneficiary file

percent of beneficiaries using five or more alternative providers were hospitalized.

These data indicate that multiple provider use in the fee-for-service sector is strongly correlated with hospital use. Such a finding has direct implications toward the impacts of weighting beneficiaries in the non-enrollment patient management model by the fraction of their total reimbursements accounted for by the provider group. These data would suggest that the sicker patients of a practice would tend to be weighted less heavily in the computation of per capita physician reimbursements from all providers. While further empirical work is warranted on this issue, it should be pointed out that a differential weighting may actually serve as a natural stabilizer for higher cost outlier beneficiaries. If beneficiaries with catastrophic expenses tend to exhibit greater fractions of other-provider reimbursements, then lesser weighting of such cases might be favorable toward stable performance measurement of patient management model groups. The most significant drawback of such differential weighting, in addition to administrative complexity, is that it could dampen financial incentives of providers to attempt to manage use of other providers.

Provider types and within-provider reimbursement shares

Explored next was whether there are medical practice style differences among provider types associated with the within-provider share of reimbursements. For example, larger shares could be captured by multi-specialty group practices because a broader range of specialties are available.

Within-provider shares were primarily analyzed with reference to "first seen" providers, but the maximum reimbursement and maximum office-visit providers were analyzed as well. Assuming the first seen provider is equivalent to a randomly selected provider, its characteristics should reflect those of the provider population in general. Characteristics of the maximum reimbursement provider and the maximum office-visit provider may differ from the first seen provider. Accordingly, some descriptive data showing the similarities and differences among the first seen, maximum reimbursement, and maximum office-visit providers are presented.

In a sample of 116,382 beneficiaries, the maximum reimbursement and maximum office-visit provider were the same provider for 46 percent of beneficiaries. Of single-specialty maximum reimbursement providers, only 39 percent of them were also the maximum office-visit provider. Multi-specialty groups with maximum reimbursements showed the greatest overlap of providers with more than 55 percent of maximum reimbursement providers also being the maximum office-visit provider.

The top portion of the Table 4.13 shows the service composition of the three provider classes by place and type of service. Regarding place of service the data suggest that, on average, maximum reimbursement providers generated greater fractions of their Medicare reimbursements from services provided in hospitals and outpatient settings. Not surprisingly, the place of service distribution was strongly biased toward offices in the case of maximum office-visit providers relative to the other two provider classes.

The mean type of service distributions in Table 4.13 reveal similar patterns. Whereas maximum office-visit providers generated greater reimbursements from medical care visits, maximum reimbursement providers

Table 4.13

MEAN SHARE OF REIMBURSEMENTS BY PLACE AND TYPE OF SERVICE:
 FIRST SEEN PROVIDER, MAXIMUM REIMBURSEMENT PROVIDER
 AND MAXIMUM OFFICE VISIT REIMBURSEMENT PROVIDER

	<u>First Seen Provider (n=109,728)</u>	<u>Maximum Reimbursement provider (n=127,646)</u>	<u>Maximum Office Visit Reimbursement (n=105,420)</u>
<u>Place of Service</u>			
Office	66.9%(44.5)	60.2%(45.6)	82.9%(31.8)
Hospital	14.8 (32.4)	21.8 (38.1)	12.5 (27.5)
Outpatient	13.6 (32.8)	13.8 (32.5)	3.6 (16.4)
Other	4.7 (20.1)	4.2 (18.9)	.8 (6.8)
<u>Type of Service</u>			
Medical visit	54.1%(43.8)	49.0%(43.4)	68.9%(35.7)
Surgery	11.7(28.9)	21.7 (37.5)	8.2 (22.6)
Consultation	2.4(13.5)	2.9 (14.5)	1.2 (7.9)
X-ray	28.6(39.8)	23.3 (36.3)	20.6 (30.6)
Other	3.3(16.7)	3.0 (15.5)	1.0 (7.3)

PHYSICIAN SPECIALTY BY FIRST SEEN PROVIDER, MAXIMUM REIMBURSEMENT PROVIDER
 AND MAXIMUM OFFICE VISIT REIMBURSEMENT PROVIDER

	<u>First Seen Provider</u>	<u>Maximum Reimbursement Provider</u>	<u>Maximum Office Visit Reimbursement Provider</u>
<u>Physician Specialty</u>			
Primary Care	45,187 (30%)	44,235 (30%)	57,463 (47%)
Medical	33,758 (23%)	32,863 (22%)	27,903 (23%)
Surgical	33,668 (23%)	39,788 (27%)	20,986 (17%)
Multiple	18,541 (12%)	19,436 (13%)	16,321 (13%)
Other	18,350 (12%)	13,031 (9%)	925 (1%)
Total	149,504	149,353	123,598

Source: 1988 BMAD Beneficiary file

generated larger fractions of their revenues from surgery, consults, and x-ray/laboratory services. Finally, the bottom portion of Table 4.13 shows that the specialty distributions appear to be very consistent with expectations given the service composition differences already discussed above.¹⁷

Table 4.14 shows the distribution of within-provider shares for first seen, maximum reimbursement, and maximum office-visit providers, as well as the results from a one-way analysis of variance of differences in the mean share of reimbursements accounted for by the three provider classes.

Among all provider types, the mean fraction of total physician reimbursements accounted for by maximum reimbursement providers was highest (66%), followed by maximum office-visit providers (48%) and first seen providers (45%). Overall these mean fractions are surprisingly high, given the data presented earlier indicating that the bulk of Medicare beneficiaries with Part B physician reimbursements used multiple practices.

The mean within-provider shares also varied among solo practitioners, single-specialty groups, and multi-specialty groups for each of the three provider classes. Single-specialty groups exhibited the lowest mean within-provider shares, and multi-specialty groups exhibited the highest. These differences were consistent among first seen, maximum reimbursement, and maximum office-visit provider classes, and were found to be statistically significant under analysis of variance tests of significance.

Provider type differences in mean shares of within-provider reimbursements could be due to differences in the kinds of beneficiaries to whom they provide services rather than some factor associated with the

¹⁷The sample sizes are larger in the bottom portion of Table 4.13 because beneficiaries with zero Medicare reimbursements or uncertain age/disability status were not excluded.

Table 4.14

MEAN SHARE OF TOTAL REIMBURSEMENTS BY PROVIDER GROUP: FIRST PROVIDER SEEN,
MAXIMUM REIMBURSEMENT PROVIDER, AND MAXIMUM OFFICE VISIT PROVIDER

	<u>Mean</u>	<u>Quartile 1</u>	<u>Median</u>	<u>Quartile 3</u>	<u>Maximum</u>
<u>First Provider Seen</u>	44.9 %	10.3 %	35.0 %	81.6 %	100 %
Solo	46.1	11.3	37.2	84.5	100
Single-specialty group	38.9	8.1	26.6	67.3	100
Multi-specialty group	54.4	15.5	55.1	100.0	100
<u>Maximum Reimb. Provider</u>	66.1 %	45.9 %	63.6 %	90.0 %	100 %
Solo	66.7	46.1	64.2	92.5	100
Single-specialty group	62.3	43.2	59.1	81.0	100
Multi-specialty group	72.3	52.3	73.7	100.0	100
<u>Maximum Office Visit Provider</u>	47.9 %	17.0 %	41.8 %	78.9 %	100 %
Solo	47.2	16.4	40.4	77.9	100
Single-specialty group	44.7	15.9	38.1	70.5	100
Multi-specialty group	57.8	25.0	59.4	94.1	100

Source: 1988 BMAD Beneficiary file

organizational form. For example, multi-specialty group practices may tend to serve beneficiaries who are healthier and/or who have lower rates of hospitalization. Comparisons in Table 4.15 demonstrate significant differences in within-provider shares with respect to a number of beneficiary characteristics including: age, gender, race, whether or not a beneficiary was hospitalized, and the absolute levels of total Medicare reimbursements. Within-provider reimbursement shares were also shown to vary by provider specialty.

Even with these systematic differences, multiple regression analyses revealed that the provider type differences remained after controlling for Medicare patient composition differences.¹⁸ In other words, even after patient differences were accounted for, multi-specialty groups exhibited higher within-provider shares of total reimbursements than solo practitioners and single-specialty groups. Single-specialty groups still exhibited the smallest shares of within-provider reimbursements.

Temporal stability in use of providers

This section reports findings from two analyses regarding the turnover of Medicare patients served by practices from year to year, and the tendencies of beneficiaries to use of the same practices over time. Lower turnover of patients and greater patient loyalty to a practice over time would help to improve the reliability of experience-rated VI measures. Although more would have been better, especially because a significant fraction of beneficiaries do not meet their Part B deductibles in any single year, only two years of

¹⁸ Regression results are available from the authors.

Table 4.15

MEAN WITHIN-PROVIDER REIMBURSEMENT SHARES BY BENEFICIARY ATTRIBUTES

Mean Within-Provider Reimbursement Shares

<u>Beneficiary Attributes</u>	<u>n</u>	<u>First Seen Provider</u>	<u>Maximum Reimbursement Provider</u>	<u>Maximum Office Visit Provider</u>
Age				
65-69 yrs.	29,135	41.3 %	69.0 %	43.0 %
70-74 yrs.	28,870	38.7	66.4	41.7
75-79 yrs.	23,734	36.8	64.5	39.6
80-84 yrs.	15,948	36.5	63.9	38.2
85+ yrs.	13,626	36.4	63.3	32.4
Sex				
Male	50,148	38.9 %	67.0 %	39.4 %
Female	76,232	38.2	65.6	39.8
Race				
White	110,066	37.9 %	65.9	39.5
Black	10,017	42.7	67.6	40.6
Other	2,641	42.7	67.8	42.1
Unknown	3,656	42.4	68.9	40.2
Hospitalized				
yes	35,684	21.5 %	51.7 %	26.6 %
no	90,696	45.1	71.8	44.8
Total Part B Physician Reimbursements				
< \$100	61,455	36.5 %	62.8 %	40.9 %
\$100-\$999	31,198	62.9	87.3	55.2
> \$1,000	33,726	19.9	52.6	22.9

Source: 1988 BMAD Beneficiary file

data were available to investigate the continuity of patient choice of practice over time.

The first analysis explores what fractions of patients seen and reimbursements received by practices in 1988 were attributable to patients that were also seen in the previous year. Matching of the individual beneficiaries served by the 1,714 sample providers with reimbursements in both the 1987 and 1988 BMAD provider file produced a sample of 1,434 providers that saw one or more of the same patients in both 1987 and 1988. In other words, 280 providers (16% of the sample) did not have reimbursements for any of the same patients in both 1987 and 1988. Omitting them increases the apparent contribution of carryover patients to Medicare reimbursements within the practice. However, it is difficult to envision practices with complete patient turnover from one year to the next as being qualified to manage their patients' care.

Table 4.16 contains some descriptive information about the contribution of carryover patients toward the 1988 patient base and level of Medicare reimbursements. For all providers in this nonrepresentative sample, beneficiaries seen in both years accounted for 38.1 percent of beneficiaries seen in 1988 and 41.9 percent of 1988 reimbursements. They also accounted for over 50 percent of Medicare reimbursements generated through office visits and office surgeries. Similar patterns prevailed for all provider types.

Whereas the above analysis examined the recurring service provision to the same beneficiaries from a provider's perspective, a match of the sampled beneficiaries from the 1988 BMAD Beneficiary file with those also present with reimbursements in the 1987 BMAD Beneficiary file permitted a beneficiary perspective on provider choice. Table 4.17 contains findings for 89,122

Table 4.16

**SHARES OF 1988 PROVIDER PART B REIMBURSEMENTS FROM PATIENTS SEEN
IN BOTH 1987 AND 1988¹**

	Solo(n=551)		Single-specialty Group(n=440)		Multi-specialty group(n=443)	
	<u>mean</u>	<u>sd</u>	<u>mean</u>	<u>sd</u>	<u>mean</u>	<u>sd</u>
Number of Beneficiaries, 1988	798.0	530.5	2,137.1	1,462.8	5,109.4	6,545.3
Percent of 1988 Beneficiaries Seen in 1987	39.1%	14.7	36.5%	12.5	38.2%	27.8
Total Medicare Payments, 1988	191,768	186,154	626,944	655,941	1,362,215	3,575,381
Percent of Total Part B Payments for Benes Seen, 1987 & 1988	42.9%	16.9%	38.2%	14.8%	42.7%	29.4%
Percent of 1988 Payments Accounted for by Benes Seen in 1987 & 1988 by Place of Service and Type of Service:						
Office visit	50.4%	17.6%	43.5%	25.1%	53.6%	38.4%
Office surgery	50.9	24.4	44.4	28.9	52.4	42.0
Office consult.	21.9	27.0	20.2	36.3	38.4	42.9
Office x-ray	50.0	21.1	41.7	22.8	45.1	48.0
Office-other	52.5	27.4	41.0	34.2	43.7	49.4
Hosp. visit	42.4	25.3	35.6	19.6	46.3	39.4
Hosp. surgery	29.9	25.4	35.5	30.5	40.7	48.0
Hosp. consult.	19.6	21.6	17.3	17.4	37.9	38.5
Hosp. x-ray	29.8	35.8	35.5	31.3	37.3	48.2
Hosp.-other	21.7	30.9	41.2	42.1	38.3	79.1
Outpt. visit	38.7	33.9	39.8	32.3	49.1	40.7
Outpt. surgery	39.1	26.8	24.8	26.5	44.7	45.9
Outpt. consult.	22.3	36.0	11.7	26.2	41.6	60.0
Outpt. x-ray	32.4	35.9	34.1	35.2	32.4	45.7
Outpt.-other	19.2	28.9	30.3	30.3	39.9	85.9
Other visit	59.7	30.8	59.1	28.4	66.0	53.6
Other surgery	58.1	45.6	42.7	48.0	69.2	78.6
Other consult.	16.8	32.5	.5	5.1	36.2	83.1
Other x-ray	55.0	42.1	53.8	67.5	55.4	90.9
Other-other	47.9	35.9	50.1	43.4	61.6	77.6

¹ Weighted by patients seen in 1988

Source: BMAD 1987 and 1988 Provider files

beneficiaries with positive physician reimbursements in both 1987 and 1988. For all beneficiaries, about 27 percent of 1988 maximum reimbursement providers were also maximum reimbursement providers in the previous year. Only a slightly smaller fraction of these maximum reimbursement providers were maximum office-visit providers in the previous year. On the other hand, nearly 47 percent of maximum office-visit providers in 1988 were similarly classified in 1987. Almost 29 percent of these same maximum office-visit providers were previously classified as a maximum reimbursement provider in 1987.

Table 4.17 shows that there are differences when the provider type of the 1988 maximum reimbursement and maximum office-visit providers are taken into account. Since single-specialty groups are more likely to provide only specialty care than the other provider types, it is not surprising that when the 1988 maximum reimbursement or office-visit provider was a single-specialty group, a smaller fraction of beneficiaries had the same provider as either a maximum reimbursement or maximum office-visit provider in the previous year 1987. For example, only 21 percent of beneficiaries with a single-specialty group maximum reimbursement provider in 1988 had that same single-specialty group as the maximum reimbursement provider in 1987. On the other hand, when the 1988 maximum reimbursement or office-visit provider was a multi-specialty group, a larger fraction of beneficiaries had the same provider classified as such in 1987. For example, the data indicate that for beneficiaries whose 1988 maximum office-visit provider was a multi-specialty group, over 58 percent had the same provider classified as a maximum office-visit provider in 1987. Overall the patterns in the provider type differences are consistent

Table 4.17

PERCENTAGES OF 1988 BENEFICIARIES WHO HAD THE SAME MAXIMUM
REIMBURSEMENT AND/OR MAXIMUM OFFICE VISIT PROVIDER
IN BOTH YEARS

	1988 Maximum <u>Reimbursement</u>				1988 Maximum <u>Office Visit</u>			
	Total	Solo	Single Spec.	Multiple Spec.	Total	Solo	Single Spec.	Multiple Spec.
1987 Maximum Reimbursement	26.9	26.7	21.0	40.3	28.8	31.4	27.4	45.5
1987 Maximum Office Visit	26.2	26.8	19.8	39.4	46.6	46.1	40.3	58.1
N	89,122	52,901	22,931	11,547	89,122	49,860	18,397	10,373

Note: The 1988 beneficiaries analyzed all had positive Part B reimbursements in 1987.

with earlier findings suggesting that patients exhibit a higher propensity to exclusively use the services of multi-specialty providers.

These findings from our provider and beneficiary analyses of patient use of the same providers over time suggest that significant fractions of the Medicare population use the same providers in consecutive years. Since a relatively large fraction of Medicare beneficiaries never meet their Part B deductible in any year, the fact that almost 40 percent of a Medicare practice's patient base is comprised of patients served in the previous year is fairly strong evidence of continuity. Likewise, the fact that nearly half of all aged Medicare beneficiaries that were Part B physician service users in both years were found to have the same provider with maximum office-visits over two years supports the premise that Medicare beneficiaries do exhibit stability in their choice of providers over time.

The following chapter will draw from the empirical findings along with conceptual aspects of the models developed earlier, to draw some policy implications concerning strategies for voluntary organizations operating under separate VI standards.

Chapter 5

DISCUSSION OF FINDINGS AND POLICY IMPLICATIONS

This chapter contains three main sections. In the first section, some pertinent findings from the data analysis are presented, along with their relevance to particular features of volume and intensity (VI) measures for volunteering fee-for-service physician organizations. In the second section, implementation strategies for separate VI targets are presented in relation to overall policy goals. In the third section, formal evaluation criteria are discussed with regard to a voluntary component of the MVPS.

5.1 Conclusions From the Data Analysis

The analysis of the distribution of BMAD providers suggested that Medicare physician reimbursements were highly concentrated among a relatively small number of practices. In 1988, 7 percent of providers accounted for approximately 50 percent of reimbursements, 10 percent of all providers accounted for about 57 percent, and 25 percent of providers accounted for about 95 percent. Hence, service delivery patterns among a small proportion of providers strongly influence overall patterns.

It would appear that participation by the larger Medicare providers would be critical for a significant fraction of total physician service volume to be included in separate VI targets for volunteering organizations. By the same token, if Medicare can successfully elicit the participation of many of these Medicare providers in a voluntary system, and these providers prove to be successful in controlling service volume, it can have a significant impact on the overall control of Part B service volume growth even without widespread provider participation.

The mean reimbursements to the practice per beneficiary seen was posited as one potential volume measure for fee-for-service practices. The variability in this measure at the practice level between 1987 and 1988 was

substantial. However, the analysis suggested that mean Medicare reimbursements per patient seen may exhibit sufficient temporal stability to serve as a meaningful performance standard measure for a practice management model under certain conditions.

Although further research is warranted to determine the critical size of a Medicare patient base, about 1,400 different Medicare patients may be needed so that a provider would not be rewarded or penalized for performance outcomes that reflect stochastic medical care demand more than control of service volume. This volume appears to be achieved by only the top 2 or 3 percent of Medicare practices. Furthermore, the analysis revealed that temporal stability of the performance standard measure of reimbursements per patient seen may be significantly enhanced by imposing a higher minimum reimbursement threshold than the Medicare deductible before a beneficiary is counted as a patient seen by a provider. Removing high cost outliers reduced the variance in reimbursements per beneficiary seen, but did not affect the apparent stability over time.

Little is known from the data analysis about why mean reimbursements per patient seen for providers varied so much from one year to the next. The insensitivity of the stability measure to removing high cost outlier costs seems puzzling. The apparent greater responsiveness to removing very low cost patients suggests that patient mix could be a significant factor.

"Randomness" due to small patient bases could be a cause, but less than 2 percent of the variation in mean percentage differences between years was explained by the number of patients seen. There may be several factors related to the variability, some of which may be controllable by providers. Obviously, the data cannot be used to estimate how much control providers may have over reimbursements per patient seen. The relative contribution of non-stochastic sources of variation, such as client health status and continuity of care, needs further study.

The distribution of Medicare Part B expenditures by beneficiary is highly skewed. Twenty-five percent of all eligibles (or 40 percent of those

who exceed the deductible) account for over 80 percent of total Part B expenditures (see Burney et al., 1984), and about 15 percent of beneficiaries account for half of all Part B expenditures. The concentration of costs among a relatively small proportion of beneficiaries results in substantial variation in estimates of reimbursement rates, especially for small groups of beneficiaries.

The analysis of beneficiary use patterns suggested that, despite the fact that relatively few Medicare beneficiaries use only a single Medicare practice annually, beneficiary physician reimbursements are still concentrated among a few providers (see Table 4.10). Analysis of provider shares of beneficiaries' total Medicare reimbursements revealed it is common for Medicare providers, particularly multi-specialty group practices, to account for relatively large fractions of a beneficiary's total Medicare reimbursements.

Given appropriate economic incentives, it is possible that providers could exert significant control over per patient costs. This appears to be true of the patient management model (i.e., total Part B reimbursements) as well as the practice management model, since patient referrals and hospitalization rates can be substantially altered when patients are managed. In computations of reimbursements per capita, if lesser weights were applied to beneficiaries with greater relative use of outside providers, a non-enrollment patient management model may begin to approximate an enrollment model where beneficiaries are locked in. While further research is warranted to better assess the effects of such a weighting scheme on the stability of performance standards in a patient management model, the study findings have favorable implications toward the feasibility of non-enrollment patient models with diminishing weights reimbursements to outside providers.

Patient management efforts would be most effective if patients sought care mostly within the relevant practices. A prerequisite for including out-of-practice services in the volume rate might be the inclusion of primary care providers, as well as a number of specialists providing hospital and

ambulatory care. Furthermore, the number of potential volunteering organizations might be significantly expanded by allowing different practices to pool their Medicare volume. Affiliated single- or multi-specialty group practices, or even solo practitioners, might achieve more reliable estimates of volume and intensity. Because the greatest possible efficiencies result when providers are concerned with efficient care for their patients as well as their practices' efficiency, new multi-specialty configurations that cover ambulatory and hospital services could be especially effective.

It is possible that pooling of practices might improve stability in volume measures more than would be expected from reductions in randomness in individual beneficiary reimbursement rates. This is because factors affecting utilization patterns can be different for different practices. Like diversification of a portfolio, aggregating practices with at least partially independent demand for their services could produce greater stability in terms of total Medicare patients seen between years.

Factors Determining the Impact of Voluntary Performance Standards

The most promising focus of Medicare's physicians payment reform for voluntary groups, which is attempting to link targets with efficiency, could be high volume providers. An important question is how closely non-enrolled models could approximate the success of enrolled systems. When physicians have an incentive to be concerned with all three dimensions of efficiency -- per unit of service, practice cost, and per patient, the greater may be the total reduction in Medicare payments.

Once managed fee-for-service is added to PPOs and HMOs, it is clear that the majority of privately insured individuals are in programs that managed their care. This means that, while only a very small percentage of Medicare beneficiaries are enrolled in organized managed care systems, the vast majority of their service providers are familiar with managed care programs and the incentives they incorporate. An important trend in medical practice is that the distinctions between the organized managed care systems are

constantly being reduced. About one-half of HMOs over three years old market themselves as PPOs and fee-for-service providers according to the Group Health Association of America. PPOs are moving toward risk arrangements with physicians that incorporate targets with bonuses and hold backs attached. The notion of serving a significant number of individuals under fee-for-service with specific volume targets closely parallels the reimbursement systems of many PPOs.

There are several factors contributing to the appeal of managed care systems in the private sector; including the selection of providers according to specified criteria, the incorporation of utilization and quality review programs and standards, and appropriate financial incentives. Medicare's physician reforms in pursuit of overall efficiency could incorporate these features to various degrees. Establishment of separate volume performance standards would involve selection of providers on the basis of potential gains in efficiency, with appropriate economic incentives. Moreover, separate contracts and quality assurance criteria and mechanisms could be established for participating organizations.

Long range policy objectives should be a factor in determining which models to pursue. A policy factor in determining which providers should be allowed to select themselves out of the national MVPS is the medical care system that Medicare physician payments should encourage. Being neutral with regard to fee-for-service versus capitation and enrolled versus non-enrolled programs, would lead to different eligibility criteria for volunteering providers than if Medicare were striving for a system of per capita payment in an enrolled program.

If a system of enrollment with per capita limits is preferred in order to limit expenditures in the long run, the options selected might encourage both per capita payments and enrollment. A key advantage of enrolled programs is that beneficiaries' incentives are to receive care from specified providers within the plan. Growth in the point-of-service payment system, in which patients are given financial incentives to choose preferred providers,

reflects the growing interest in marrying beneficiary and provider incentives. Encouraging more enrolled systems might be accomplished by establishing different co-payments under Medicare PPOs. Assuming providers want to volunteer, a system that includes payments outside the volunteering provider, even if they are given only partial weights, would encourage greater patient management. To encourage non-enrolled patient management programs, some incentives for the beneficiary at the point-of-service might be incorporated.

5.2 Recommended Strategies for Implementation

The quantitative findings and policy considerations suggest that the voluntary component of MVPS might aim first at providers that deliver large fractions of Part B services to their patients. Accordingly, health plans that enroll beneficiaries and provide comprehensive coverage should be given first chance to establish voluntary arrangements. Since the potential for large numbers of beneficiaries enrolling in health plans may be limited, due to understandable preferences for freedom-of-choice and widespread extended coverage through medigap supplements, developing non-enrolled systems in which providers are still concerned about total Part B costs seems to be a desirable objective.

Third priority might go to encouraging voluntary arrangements among those providers with high patient volume and that receive large aggregate Part B reimbursements. Even if the potential among many of those providers to manage all patient care may be very limited, separate VI targets for them could encourage management of services within their practices. While this third category may be least desirable in terms of attaining efficiencies, its significance as a long-run cost control program may be greatest since it does not depend upon beneficiary enrollment or providers taking on the responsibility for all patient management. Importantly, many specialists can be included within this alternative, which could significantly expand the size and scope of the voluntary component of MVPS. Finally, since relatively few providers might be eligible on the basis of the number of beneficiaries they

currently see, pooling of providers might be considered for both the practice and patient models.

Presented below are characteristics of the four possible categories of voluntary arrangements for volume performance standards, ranked in terms of their policy priority. These descriptions should be viewed as tentative, and subject to further analysis and refinement.

1. Enrolled programs: HMOs, HCPPs and PPOs

The guiding principles of MVPS might be extended to beneficiaries and providers involved in health plans that involve contractual relationships, i.e., formal enrollment and membership. For HMOs with risk contracts, AAPCC payment rates could be adjusted to reflect Medicare's target volume rates for each year, but not reduced because of fee penalties to fee-for-service providers.

For HMOs with cost contracts and for HCPPs, VI targets could be established on the basis of Part B volume rates per enrollee in the prior year. Some minimum number of Medicare enrollees would seem desirable so that volume targets would be reliable. The minimum number could be altered depending on past experience and the overall size of plans. Potential enhancements to the reliability of VI measures might be considered even for enrolled programs. In general, because involving health plans with enrollment may be the highest priority for policymakers, plans might be given some flexibility in terms of particular model features and parameters. For example, plans could decide whether they wanted to count high cost outliers in volume rate measures versus excluding services beyond a certain level, say the mean plus two or three standard deviations.

2. Large multi-specialty groups (patient management)

Second priority might go to medical practices that are able to exert significant control or influence over the overall utilization patterns of their patients. Preferably, eligible multi-specialty practices would have

relatively high aggregate Part B reimbursements due to a high volume of Medicare beneficiaries, and a large fraction of total Part B reimbursements for their patients.

For volume rate measures, beneficiaries with relatively small fractions of reimbursements within the practice might be given lesser weight. Furthermore, Part B payments in excess of, say two standard deviations above the mean, could be taken out of volume rate measures.

3. Other practices with high reimbursement rates (practice management)

The third priority might go to medical practices that have high rates of Medicare revenues, but would not be considered good candidates to manage their patients' overall utilization patterns. Solo practitioners, single-specialty groups and multi-specialty groups that see a large number of beneficiaries and receive very high aggregate Part B reimbursements could be considered. To enhance the reliability of VI targets, payments for individuals below a relatively low dollar threshold (e.g., less than \$100) could be excluded. Similarly, VI measures might exclude reimbursements within the practice for individual patients that were extraordinarily high (e.g., the mean plus three standard deviations).

4. Pooling of individual practices' experiences

A number of options are worth considering for individual practices that do not meet any of the criteria presented above. One option would be to allow practices to come together for purposes of establishing and operating under a voluntary volume performance standard. It may be worthwhile to pool the experiences of practices managing their patients (option 2 above) and/or practices managing only their practices (option 3 above).

Alternatively, individual practices might operate under a separate VI target that actually reflects a blend of their own experience with the national MVPS. A weighting system could be established, based on the

reliability of individual practices' volume measures, in which the national performance accounted for a varying proportion of the target.

Providers, particularly large multi-specialty groups, could select over time to be in any one of the groups. For example, a large multi-specialty group eligible to participate on the basis of total Part B reimbursements for its patients (i.e, number 2 above) may opt at first to participate on the basis of only its own practice costs (i.e., number 3 above). Furthermore, it may be desirable to find ways of encouraging those medical practices with ties to existing HMOs or PPOs to, in turn, encourage those health plan to enter contracts with Medicare for enrollment of beneficiaries.

Alternatively, Medicare may choose to actively support voluntary targets without enrollment as a major means to more efficient overall service delivery. Provider and/or beneficiary inducements could be considered. For example, Medicare could reduce beneficiary cost sharing when using practices operating under their own VI targets. However, whether to encourage any of the models discussed above depends upon their value in relation to several criteria, which are presented next.

5.3 Evaluation Issues

The criteria by which alternative voluntary volume performance standards may be evaluated include:

- o Likely provider interest
- o Beneficiary access to appropriate services
- o Program cost savings
- o Program implementation
- o Quality of care implications

When evaluating voluntary target alternatives, it is important to compare them against the national MVPS. Furthermore, the concerns raised in the 1990 report of the Physician Payment Review Commission must be addressed. The Commission questioned whether the voluntary system would yield cost savings through efficiency or patient selection, whether access to care for sicker

patients would be endangered, and whether quality of care would be adversely affected.

Provider interest

The national program is mandated and all physicians will be required to abide by the limits established. The tightness of the limits and their enforcement, through future reductions in conversion factors, will be the major determinant of whether providers will desire to practice under their own volume target. In other words, providers' perceptions about what is likely to occur under the national MVPS will be paramount. How the volume performance standards program is implemented at the outset will be very important in this regard, as providers will consider what would happen to the financial well-being of their practice over time under the national versus their own volume performance standards. To offset the possibility that providers will take a "wait and see" attitude toward the national MVPS, voluntary targets might be initiated on a "hold harmless" basis. That is, participants could be guaranteed to be no worse off than if they had stayed under the national MVPS.

Assuming that target rates of growth set by Congress are below recent trends in Part B expenditures, providers with significant Medicare revenues may not want to be harmed by the actions of physicians who have little interest in controlling costs, or are only slightly harmed if future Medicare payments are lowered. HMOs, which must manage within budgets, also should desire to participate within a system of greater predictability and control. If HMOs are able to stave off fee penalties by staying within volume performance standards based on their enrollees, their competitive position may be enhanced. Thus, overall HMO participation could increase. Similarly, the national volume targets provide the opportunity to increase provider interest in becoming an HCPP.

The interest of existing PPOs in participating under a voluntary system would seem to depend on the level and relative importance of Medicare revenues, and the organization's involvement with overall targets for their

private sector business. The interest of multi-specialty groups in participating on the basis of total per beneficiary Part B payments is more difficult to assess. Limiting the appeal is the possibility that their economic success will depend upon changing patients' utilization patterns of providers outside the multi-specialty group. To the extent the group feels it has some control over all physician use through referrals, a large multi-specialty group could see this as an opportunity to enhance its practice revenue over time, without exceeding the overall target rates of volume increase on a per beneficiary served basis. Practices would have to manage all Medicare patients seen without knowing if they will account for a significant percentage of their payments in any year. The interest in multi-specialty groups participating could be enhanced if beneficiaries were given incentives to stay within the practice for services available there. This might be done through lowering the deductible or beneficiary co-payment rates, although supplemental insurance may thwart that strategy.

The interest of practices participating on the basis of their own targets would depend on their degree of confidence that their average Medicare reimbursement would not be growing because of additional services being offered by the practice. For example, practices that expect to undergo changes in terms of specialty composition or equipment acquisition may not have confidence in volume rates predicated on past experiences.

Some physicians also may foresee an impending treadmill consisting of higher volume and lower fees under Medicare nationally. Obviously, physicians who intended to arbitrarily increase service volume, and therefore preferred to remain "anonymous," would not volunteer. From a national program perspective, having those practices that receive significant revenues from Medicare operate under separate volume performance standards will mean that those providers left under the national MVPS are more likely to be affected collectively by the consequences of generally inefficient practice patterns. Providers seeking efficient practices may seek alternative volume performance

standard arrangements, either on their own or through a pooling arrangement, leaving relatively inefficient practices to weather cumulative fee reductions.

Beneficiary access to necessary care

Underutilization as a result of a reimbursement system is an important issue when providers' incomes could be adversely affected by providing necessary care. Traditionally, this concern has focused upon HMOs because additional services mean higher costs and thus lower income to the provider. In general, a target volume with penalties in the future provides far weaker incentives for underutilization than does capitation. Moreover, overall access of Medicare beneficiaries under the RBRVS fee schedule and the mandatory national volume performance standards could be reduced if Medicare rates become less attractive vis-a-vis other payers.

For those groups participating in the voluntary program on an enrollment basis, initial access by high cost patients to these systems might be affected negatively since future per capita targets are based upon historical costs within the practice. High cost patients having access problems often are the chronically ill. However, systematic patient selection efforts will shape future volume rates, and thus future target levels. Once in the historical base of the practice, moreover, high cost patients may not be discouraged from staying with the practice.

In terms of appropriate referrals, problems might emerge for providers that receive payments based on reimbursements to their practice. By narrowing the focus of their practice and referring patients to another provider, program participants might be hindering access to care as well as raising total Part B costs. The same behavior could exist under the national program if providers want to reduce Medicare beneficiaries as a percentage of total patients seen. However, since referrals outside the practice run the risk of lowering this year's revenue, next year's revenue, and future volume targets, the pressure to refer out is reduced. Since access is a concern for both the

national and voluntary volume performance standards, it will have to be monitored on an on-going basis.

Program cost savings

Voluntary volume performance standards would seem to have greater potential to generate more efficient practices and patient care than the national MVPS, due to the closer link between volume rates and future fee levels. Since the rate of increase allowable by Congress under the national MVPS "sets the stage" for providers' interest in voluntary arrangements, the crucial issue is the restrictiveness of those rates relative to current trends.

An undesirable consequence of a voluntary system, which should be monitored, could be apparent cost savings that actually result from negative provider behaviors, such as systematic patient selection or underservice. For example, providers participating on the basis of their own practices' payments could game the voluntary system by seeing more patients less often. In particular, they could deliver services of lower volume and intensity than average to new patients and drive down their observed volume rates. This would, in turn, allow them to increase revenues from other patients yet stay within the target average volume per patient seen.

Assuming that physicians prefer to participate in Medicare under a voluntary target, there will be incentives to join or form enrolled programs and for larger fee-for-service practices to grow. If this happens, and voluntary plans do operate more efficiently over time, efficiency in the medical care system could be enhanced, producing long-term cost savings.

Implementation

There are two major implementation issues to be considered: beneficiary knowledge and administrative feasibility. Beneficiaries need to be made aware of potential consequences for themselves of both mandatory and voluntary volume performance standards. It would probably be desirable to make

1. The first part of the paper is devoted to a general survey of the progress of research in the field of human evolution during the last few years.	
2. The second part is devoted to a detailed examination of the evidence for the existence of a common ancestor of man and the lower primates.	
3. The third part is devoted to a detailed examination of the evidence for the existence of a common ancestor of man and the higher primates.	
4. The fourth part is devoted to a detailed examination of the evidence for the existence of a common ancestor of man and the higher primates.	
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beneficiaries aware that their providers are operating under standards that are monitored in terms of the providers' experience.

Data processing issues undoubtedly will be of significant concern. Aggregating reimbursements by beneficiary and by provider, which to date has been done only for special purposes, would need to become a routine function. Implementation, therefore, may depend on features of the Common Working File data system, now under development by HCFA. The administrative burden of carrying out the many data steps necessary to monitor separate volume measures can be lessened by streamlining those steps whenever possible, and if necessary, limiting the total number of separate voluntary arrangements in operation at any time.

While it is possible to retrieve bills retrospectively for the purpose of measuring reimbursements by beneficiary or by provider, it would seem much easier to do that prospectively. In other words, putting a prospective tap on bills that are associated with designated providers would greatly simplify necessary data collection. Under both the enrollment and "within-practice only" volume measures, most or all of the data could be collected in this way.

Greater administrative difficulties arise for the multi-specialty groups operating under non-enrolled, "patient management" models. By identifying the limited number of such practices at the outset, all bills within the practice could be tapped, as could reimbursements to other providers for beneficiaries already seen within the volunteering practice. Once a patient is seen, an administrative mechanism can be established so as to synthetically enroll this individual in the multi-specialty plan and tap future claims. However, reimbursements to other providers during the relevant time period, but before an individual makes contact with the practice, would be the most difficult to retrieve. Potentially, all bills occurring from this earlier time for the individual must then be collected retrospectively. If so, the very limited number of such plans at the outset makes this burdensome administratively.

As discussed previously, adopting a point-of-service incentive for these voluntary programs would have a number of advantages. In terms of

administration, if individuals designated the group as their primary care source, this would allow patient identification similar to an enrolled program.

Quality of care

A voluntary program that benefits providers that are evaluated separately for Part B volume rates may, in general, add to overall quality of care. If physicians' interest in voluntary arrangements is coupled with Medicare's use of provider selection and quality assurance criteria, then the resulting set of practices operating under their own targets could form the beginnings of a "preferred provider" category. Criteria for recognition as a preferred provider under Medicare (beyond minimum volume requirements, etc.) could include special licensing, staffing, levels of insurance, referral protocols, and other service-related experiences (such as malpractice suits). Also, since the number of practices under voluntary arrangements is likely to be a small proportion of all providers, monitoring would be easier to accomplish.

If the MVPS, including a voluntary component, increased the number of Medicare beneficiaries in enrolled plans, the comprehensiveness of care (particularly primary care) would be encouraged. The practice management models will not encourage more comprehensive care. Over time, these practices, however, could establish referral patterns that work to minimize duplicate tests and unnecessary procedures.

Chapter 6

NEXT STEPS

This report discussed the rationale for Medicare to adopt volume performance standards for voluntary physician organizations, in order to have providers be rewarded for their own practice efficiencies as opposed to national norms. Volume performance standards can be applied to existing HMO and HCPP programs that care for an enrolled population on a risk or cost basis. The greater challenge is to develop a reimbursement program that can be attractive to providers caring for non-enrolled individuals. This study has explored some models and methods. However, a number of further investigations seem worthwhile.

Perhaps, the first step from here is to learn under what conditions providers would like to participate under their own standards. The obvious groups to survey and discuss this option with are HCPPs as well as HMOs currently operating on either a risk or cost basis. These plans will be negatively affected by blanket fee reductions stemming from the national MVPS. Unless these providers anticipate that Congress will not set restrictive targets, they will be attracted to such a program.

The second set of analyses needed are to corroborate these findings at the provider and beneficiary level using improved data. Provider analyses could be redone using the Unique Physician Identification Numbers (UPIN) when they are complete. These data would provide information on the basis of physicians within the practice. For a sample with UPINs an attempt should be made to group physicians that practice together. Whereas solo providers

represent 60 percent of visits in the BMAD data, AMA data describe 60 percent of providers as practicing in groups. This leads to some question as to the value of the descriptor "solo" in the current analyses by provider types.

Another important analytical step would be to create a file that matches BMAD-Provider file data and the records from other Medicare bill files, particularly the Medicare Automatic Data Retrieval System (MADRS). In this study, time did not permit such a match; this was approximated in the analysis by using provider utilization patterns for a sample of beneficiaries drawn from the BMAD beneficiary files. From merged data including Part A and B information, it would be possible to compare the fractions of total reimbursements to different types of medical practices, test alternative weighting arrangements for services provided inside and outside the practice by type of service, and analyze the contributions of health status differences.

A merged data file will permit studies of relative efficiencies among different practices, with regard to what has been termed patient management (or total physician reimbursements). Since this study, based on findings about size and stability, recommended that multi-specialty groups be encouraged to operate under a voluntary program, it is important to learn whether such practices are more or less efficient at the outset. In particular, are multi-specialty groups more or less costly in terms of Part B and total (A and B) reimbursements than single specialty or solo physicians providing primary care? Questions such as how does the size and location of the practice relate to patient efficiency could be explored as well.

The analysis performed in this report used projections of the mean expenditure per patient seen to identify practices whose revenues might be

stable over time. Great variation was shown by practice size, but overall instability was higher than might be hoped. With the merged provider and beneficiary data file, extended analysis of the stability of average revenue per patient could be explored. In addition to looking at the stability for expenditures within the practices, the analysis would expand to doing similar statistical tests on the basis of all physician reimbursements. Once this is done, further analyses to investigate how to reduce sources of error could be explored. They would include using multiple years of data, deleting cases with low levels of reimbursement, and doing separate analyses for beneficiaries with and without a hospitalization.

In principle, greater stability in the predictability per practice could result if adjustments were made for all the patients seen by the practice, not only Medicare beneficiaries seen. Practices could have great stability in total revenues and revenue per patient seen, but the distribution between Medicare beneficiaries and non-Medicare beneficiaries may vary from year to year. An analysis using more comprehensive data for the medical practice might be attempted. If such stability is present, it would be useful evidence in deciding whether or not to pursue and/or expand the reimbursement approaches that place targets on Medicare's reimbursement to practices.

Stability in the predictions could also occur by pooling practices. The analysis provided in this report was based upon variations associated with the number of beneficiaries. Stability in the estimates might be improved by pooling a number of practices according to size, location or other criteria. Also, shrinkage estimators, that is, applying varying weights to the individual practice and some "group estimate" based on relative variances could be analyzed.

2. The second part outlines the specific procedures and protocols that must be followed when recording transactions. This includes details on how data should be collected, stored, and reviewed to ensure its integrity and reliability.

3. The third part addresses the role of the management team in overseeing the record-keeping process. It stresses that management is responsible for ensuring that all staff are properly trained and that the necessary resources are provided to support the system.

4. The fourth part discusses the importance of regular audits and reviews of the records. It explains that these checks are necessary to identify any discrepancies or errors and to ensure that the system remains up-to-date and effective.

5. The fifth part provides a summary of the key points discussed in the document and reiterates the commitment to maintaining high standards of record-keeping throughout the organization.

Finally, a premise of this study, and one that significantly affects its desirability, is that beneficiaries would not have to be enrolling to allow voluntary targets to be established for the practice management and patient management models. The lack of an enrollment process creates substantial data processing requirements and, therefore, additional costs. It would be worthwhile exploring the willingness of beneficiaries to designate their current provider as their primary care giver. For example, would beneficiaries be willing to designate and use such a provider for primary care and referrals if the Part B deductible were waived? This model is a limited version of the point-of-service approach and could be shown to be cost saving for beneficiaries and Medicare (on the basis of Part A and B costs). Such a system might make participating in a patient management model more attractive to providers as well since it would help assure practice volume.

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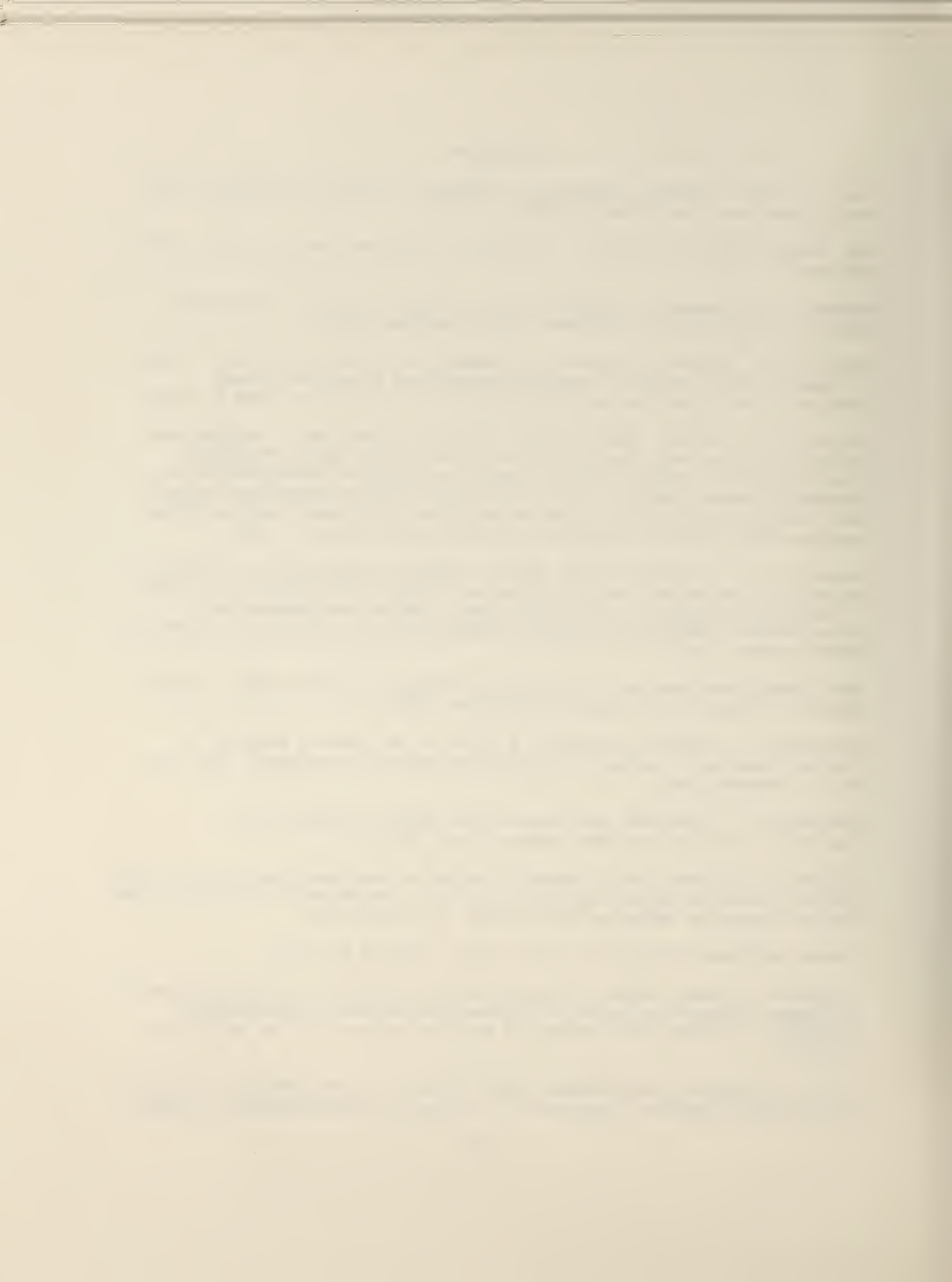
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Appendix 1

Scope of the MVPS

In response to rising Medicare Part B expenditures the Federal government has enacted the mandatory national MVPS, which includes the following services when paid for by Medicare carriers (Federal Register, 1989):

- o Physicians services (which are broken down as follows: 15% for primary care; 42% for radiology, anesthesiology, and overpriced procedures; and 43% for other services)
- o Services and supplies furnished incident to physician services
- o Outpatient physical, speech, and occupational therapy services
- o Antigens prepared by or under the direct supervision of a physician
- o Services of physician assistants, certified registered nurse anesthetists, certified nurse midwives, psychologists, and social workers
- o Diagnostic x-ray tests, diagnostic laboratory tests, and other diagnostic tests
- o X-ray, radium, and radioactive isotope therapy
- o Surgical dressings, and splints, casts, and other devices used for reduction of fractures and dislocations

Services that are not currently included under MVPS include:

- o Diagnostic x-ray, laboratory, and other services furnished in hospital outpatient departments (except medically necessary physician interpretations of those tests)
- o Durable medical equipment
- o Ambulance services
- o Services furnished by ambulatory surgical centers

Technical Appendix

Analytic provider file construction

The main file used for analysis of provider delivery patterns was comprised of a sample of providers drawn from the 1988 BMAD Provider file. The provider sample was selected on the basis of information derived from the 1988 BMAD Provider Summary file. Because of the small number of multi-specialty groups represented in the BMAD Provider file, the Medicare provider numbers of all 911 multi-specialty groups identified from the 1988 BMAD Provider Summary file were selected. Random samples of solo providers and single-specialty groups were then drawn from the 1988 BMAD Provider Summary file. Providers were selected when a random fraction generated from a uniform distribution was less than the sampling fraction needed to generate more than 1,000 providers for each sample of solo physicians and single-specialty groups. This process actually yielded a total of 2,967 provider numbers: 1,029 solo practice physicians, 1,027 specialty groups, and the 911 multi-specialty groups.

Given that the BMAD Provider files contain a fairly large number of providers with few claims and little or no Medicare reimbursements, it would have been preferable to bias the solo and specialty group provider sample toward providers with larger Medicare reimbursements. Given the highly skewed distribution of aggregate Medicare reimbursements among providers, such a sample would not have allowed us to substantially reduce the number of claims to be analyzed from the more than 48 million physician claims in the entire 1988 BMAD Provider file. The relatively small sample of 2,967 practices still had over 5 million beneficiary claims in 1988.

Given this sample of Medicare provider numbers, all beneficiary claims for these provider numbers were sought from the 1988 BMAD Provider file. After the 48 million records from the 1988 BMAD Provider file were passed against the sample provider numbers, it was determined that no claims were found for 114 providers. The claims for these providers were processed by carriers serving the following states: North Carolina, South Carolina, Indiana, Wyoming, Idaho, Tennessee, Kentucky and Illinois. After some investigation it was discovered that these carriers had submitted provider numbers that were in error in the 1988 BMAD file, and that these errors were corrected in the 1988 BMAD Provider Summary file, which was used to select the sample of providers. Accordingly, the corrected identification numbers did not match the original erroneous numbers in the 1988 BMAD Provider file. Given the small number of providers involved, the 114 providers were dropped from the analysis. Although the samples of solo physicians and single-specialty groups were no longer representative of the national population given these match failures, the analyses are unlikely to be seriously distorted even that the 114 providers accounted for less than 4 percent of the original provider sample.

Claims associated with the provider subsample were sorted by provider number and also by Medicare HIC number for beneficiaries within each provider. Beneficiary claims were then aggregated to form a set of individual Medicare patient summary records for each provider. From these patient summary records it became feasible to obtain counts of unique Medicare patients seen over the year, and to identify individual patient outliers with high reimbursements. Patient summary records with zero reimbursements were then deleted from the patient level analytic file. This not only reduced the number of patient

records on the sample file, but also reduced the number of sample providers remaining since some providers with few patients received no actual Medicare reimbursements.

This file with patient level summary records was further aggregated to produce provider records containing summary information about the number of patients seen, and dollars of 1988 Medicare reimbursements by place and type of service categories. This aggregation of patient records yielded an analytic file of 2,671 provider records, including 933 solo practice physicians, 807 multi-specialty groups, and 931 single-specialty groups. This analytic file was employed in the cross-sectional analyses of provider delivery patterns.

The original sample of provider numbers drawn from the 1988 BMAD Provider Summary file was also employed to select all claims from the 1987 BMAD Provider file for the same providers. After sorting and aggregating the 1987 claims data to beneficiary records, beneficiary records were again aggregated to yield provider records. The providers with positive 1987 reimbursements were matched to the 2,671 providers with positive reimbursements in 1988, yielding 1,714 providers with positive Medicare reimbursements in both years. This provider sample file was employed for the multi-year analyses of the stability of performance standard measures.

A third analytic file was created from the claims drawn from the 1987 and 1988 BMAD Provider files. Whereas the multi-year file described above was created by matching provider records for the two years, a second multi-year file was created by matching the 1987 and 1988 beneficiary records, derived from aggregation of claims, for beneficiaries who had positive Medicare reimbursements in both years. These matched records were aggregated to the

level of provider after retaining information on variables such as the numbers of beneficiaries served, and Medicare reimbursements by place and type of service. This provider file was employed for analysis of new versus returning patients to providers in 1988.

Analytic beneficiary file construction

The analytic beneficiary files were derived from individual claims data contained in the 1988 and 1987 BMAD Beneficiary files. Summary records were created for a sample of 150,184 Medicare beneficiaries from claims data. These summary records, containing beneficiary demographic attributes, summary information about providers used and reimbursements, and more detailed information about the first seen practice, the maximum reimbursement provider, and the maximum office-visit provider, were derived through two major steps described below.

In the first step, beneficiary HIC numbers were retrieved from the 1988 BMAD beneficiary file for beneficiaries who met the following criteria:

- o the beneficiary was not entitled to Medicare under ESRD status,
- o the beneficiary had at least one claim for a single-specialty or multi-specialty group practice, or had claims only for one or more solo practice physicians.

Solo physicians, single-specialty groups, and multi-specialty groups were identified employing the same consistency screens used in defining provider type in the provider analyses. Accordingly, the selection criteria amounted to not selecting providers whose provider type was ambiguous due to inconsistencies among related variables. Each beneficiary was given a code depicting whether the beneficiary was selected because they used a single-specialty group, multi-specialty group, or only solo physicians.

Given the vector of selected HIC numbers and the provider type selection code, a random sample of beneficiary HIC numbers was chosen for each provider type selection code to yield about 50,000 beneficiaries in each class of beneficiary. The actual random selection process yielded 51,887 beneficiaries who exclusively used solo practitioners, 47,212 beneficiaries who used at least one multi-specialty group, and 51,085 beneficiaries who used at least one single-specialty group.

In the second step of the process, the sample of beneficiary HIC numbers was used to select beneficiary claims from the 1988 BMAD Beneficiary file. These claims were subsequently aggregated into summary records outlining provider use patterns of beneficiaries.

The sample of beneficiary HIC numbers used to select beneficiaries from the 1988 BMAD Beneficiary file was also used to create beneficiary summary records from the 1987 BMAD Beneficiary file for the same sample of beneficiaries. Beneficiary 1987 summary records were created for 119,676 beneficiaries, or about 80 percent of 1988 sample beneficiaries. The 1987 and 1988 beneficiary sample files were matched on the basis of beneficiary HIC in the creation of a two-year analytic file that was employed to analyze the tendencies of Medicare beneficiaries to use the same maximum reimbursement and/or maximum office-visit providers over more than one year. Matched records were retained in the analytic file only when beneficiaries had nonzero reimbursements in both years.

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